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VOLUME 7 NUMBER 7 APRIL 12, 1988

PC Labs Tests 6 Low-Cost DTP Packages

- Project Database Kickoff!
 PC Labs Tackles
 24 Flat-File Databases.
 Who Survived?
- 386 Accelerator Boards for Born-Again XTs
- Jim Seymour's Sane Look at Spreadsheet Madness

Special OS/2 Coverage: Installing It Right Applications—What and When?

Affordable Desktop Publishing







presentations looked like they were done on a typewriter.

It was a case of 21st century computer thinking trapped in a 1935 typeface. Joe knew if he was ever going to be a success he'd have to control his LaserJet.*

One jet jockey's quest to be captain of his ship.

The following day was spent scouring the computer stores for a way to upgrade. But to no avail. Until he stepped through the door of one of those high-tech boutiques. "Sure, JetWare™ makes it."

the bearded guru replied to Joe's query. "Their fonts are designed by technology specialists, not hardware manufacturers."

Real typefaces deliver the Laser's edge.

When Joe left the store his arms were piled high with JetFont™ cartridges. There were cartridges for upgrading his LaserJet from typewriter faces to real faceslike Helvetica Bold for headlines and Times Roman for body copy.

There was a cartridge that would bring smiles to his company's overseas offices. It had all the international characters on it. There was even a JetWare cartridge that had all the classic spreadsheet fonts.

And JetWare fonts had the look of typeset. They were cleaner, more consistent and came with attractive proportional spacing as well as fixed pitch.

This was the stuff of which heroes were made. And they were fully compatible and backed by the reliability of CPI.

Lotica reduces Lotus spreadsheets to letter size.

But what really made Joe the talk of the office was his discovery of JetWare's new 123™

cartridge that lets you squeeze 40,000 characters on a single 81/2 x 11 sheet.

1-2-3** spreadsheets down to size. The secret of its success was "Lotica" a special typeface designed by JetWare that was so sharp it could be almost infinitely reduced and still be legible.

Now that was space age! It meant the end of the dot matrix printer and all the cut and paste nonsense that went with it.

Joe was so hyped, he wanted to do more. His mind turned to graphics. But to accomplish

what he wanted, he knew he'd have to find a way to get more memory into his LaserJet.

JetWare's incredible shrinking technology expands memory, improves reliability.

There it was right on the shelf. One of the hottest new products to hit. the market. JetMemory. JetWare had reinterpreted the memory card. Shrunk it

down to size. And with the help of surface mount technology, they managed to get two cards to fit into the space HP had allotted for one. You could add memory without discarding expensive memory cards.

It was maximum economy.

The bright future. JetFont, JetMemory and Joe.

With every new success Joe's fame grows. They know him from the tall towers of corporate headquarters where they pour over his spreadsheets and plan strategic takeovers...to the tranquil field office in India where they meditate on the beauty of Joe's stylish pitches.

Now, wherever intelligence, fortitude and perseverance are appreciated, they talk of Joe. The man they call "Captain Jet."

CIRCLE 159 ON READER SERVICE CARD



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Microsoft Corp. and International Business Machines Corp CIRCLE 369 ON READER SERVICE CARD

WHAT'S INSIDE

One of PC Magazine's hallmarks is its "blockbuster" coverage of individual product categories. Recently we've reviewed 55 word processors, 106 printers, 59 accounting packages, and 87 modems. But you could call the first Project Database, published back in June 1984. BlockBuster Release 1 0-it was the granddaddy of them all. In it we reviewed

66 products. Here, we begin our third go-around with

databases, the third-largest PC application (after word processors and spreadsheets). Consistent with our previous coverage, we've broken down the field into three categories—flat-file, relational J. BMS packages—covered in three consecutive issues. For reviews of the flat-file managers, see "Flat-File Databases: Easy-to-Use Sophisticates" on page 153.

As good software or hardware companies do, we've enhanced, extended, tweaked, and tuned our database tests with each iteration. "For Project Database 3, we've increased the size of the test load to better simulate heavy-duty real-world applications," says John Dickinson, director of PC Labs. "But the objective was to keep the tasks in line with the products' capabilities. Consequently, we loaded flatfile databases with files containing a maximum of 5,000 records, and the relational/programmable DBMSs with a maximum of 50,000 record files." As this series unfolds, you'll see that some products thrived under these arduous conditions; others were squashed by the load.



John Dickinson, the new director of PC Labs, honed the Project Database benchmark tests into challenging, but fair, procedures.

If you experienced déjà vu with the mention of John Dickinson's name, it's because our new PC Labs director has been a PC Magazine salwart for a long time. A product reviewer for the first Project Database, John originated the testing and editorial for our first Printer project, back in 1984. He returns to us after a sint as editor of Computers in Banking magazine. Welcome back, John!

While the database project carries with it the weight of tradition, our coverage of OS/2 explores a new frontier for PC applications. In "OS/2: A New Beginning for PC Applications" on page 273, Charles Petzold describes what OS/2 will mean for users and applications. The Productivity section offers a number of ways to stretch OS/2 to the limit. Charles Petzold tells you how to install OS/2 in ways IBM never told you. You'll find tips on how to write applications for the operating system without shelling out for the developer's toolkit. And in PC Tutor, you'll see what Microsoft could have (should have?) done in designing OS/2 to avoid incompatibilities with existing DOS programs.

PC Managine The Independent Guide wilder Goodword Present Company (1997) (1998) 1997 (1998) (1997) applicable to worthy comp in the byte and Auguste to 1997 (1997) and recomp are 22 mers, and 1997 (1997) as the two person and 1997 (1997) for the recomp and a first the present and and of white interpress pressures, 222 (1999) and present the present and and of white interpress pressures, 222 (1999) and present the present and and of white interpress pressures, 222 (1999) and present the present and and of white interpress pressures, 222 (1999) and present the present and an additional management of the present and additional manag



ntroducing the PostScript laser printer that blacks out at high speeds.

The new OMS-PS* 810 can compose and print the most complex pages in record times, with richer, more saturated blacks than ever before. All with the desktop publishing power of Adobe PostScript*, and the superior print know-how of OMS, an industry leader.

Under the hood OMS ASAP™ (Advanced System Architecture for PostScript) is proprietary technology that helps eliminate the hardware bottlenecks that hinder other PostScript printers. As a result, QMS-PS 810 boasts processing speeds remarkably faster than other PostScript printers in its class. And faster output means greater productivity. In addition, the OMS-PS 810 laser printer's new Canon*

SX* print engine covers solid areas and prints fine detail better than previousgeneration engines.

Fast start, strong finish You can adorn your documents with one or all of the 35 Adobe typefaces. Thanks to PostScript, there's an infinite number of font variations available. You can also make type as large or as small as you want. And put it anywhere on the page. In fact, with PostScript you enjoy total control over the design of your page. It gives you the complete desktop publishing power to do things that would otherwise be virtually impossible. So you get high-quality output exactly how you want it.

Along with PostScript, the HP LaserJet +" Diablo* 630 and HP-GL" printer emulations are added for your non-PostScript software.

The QMS-PS 810 laser printer is easy to use, maintain, and comes with a one-year warranty. It's available from Laser Connection dealers. Laser Connection is a sales and marketing subsidiary of QMS. For the dealer nearest you call 1-800-523-2696.









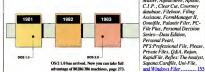


COVER STORY

Desktop Publishing's

Inexpensive Upstarts Cheryl J. Goldberg/ Lately, the market for PC desktop publishing has been besieged by low-cost products promising professional results at a savings of both time and money. But is it possible to find true quality in products that cost from \$80 to \$500? See for yourself with our benchmark tests of Byline, GEM Desktop Publisher, PageBuilder, PFS:First Publisher, NewsMaster, and





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DATABASE MANAGEMENT Project Database 3: Covering

All the Bases Jim Seymour/ In the PC Magazine tradition of reports on whole classes of software, we tackle the sometimes enigmatic category of databases. Here we begin a

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Flat-File Databases: Easy-to-Use Sophisticates

Jim Seymour/ The best flat-file managers have grown increasingly flexible, featurefilled, and easy to use. Why struggle with a complicated relational product when you can choose 1 of the 24 flat-files reviewed here: Advanced DB Master, Alpha/three, Apollo, C.I.P., Clear Cut, Courtney database, Filebase, Filing Assistant, FormManager II. Omnifile, Palantir Filer, PC-File Plus, Personal Decision Series-Data Edition. Personal Pearl. PFS:Professional File, Please, Private Files, Q&A, Rajan,

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☐ Orchid PC-Turbo 286e

☐ Breakthru 286-12

We are excited about our three speedup products. You probably know about our Lightning disk access speedup software that was awarded PC Magazine's Best of 1986 award (see box). After the smashing success of Lightning, in late '86, we But, no speedup board cuts disk

LIGHTNING

"Lightning is almost mandatory...." -

Steve Manes, PC Magazine

Best of 86 review

everything is automatic. Programs that frequently access the disk (hard or floopy) are made instantly up to 2 to 4 times faster. Uses a principle greatly enhanced

from mainframe technology called caching. Fully ex ploits Above Board memory.

universal compatibility with other software. Data is

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LIGHTNING is the standard against which all our competition measures itself because we achieve

Loads with the DOS - always ready as a background program to accelerate disk access. You do nothing

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guaranteed the Breakthru 286 board to be literally the most advanced, fastest, most feature-nich board available. The runaway success it has enjoyed truly proved that assertion. Now we go ourselves one bet-ter with the Breakthru 286-12. This new board has the clock speed cranked up from 8 to 12 MHz for speeds up to 10.2 times faster than an IBM PC. It is 50% faster than an 8MHz IBM AT, and up to a whopping 1,000% faster than a regular PC.

HERE'S WHY THESE TWO BOARDS ARE SO SPECIAL First, they install so easily. A half-slot card means you don't even have to give up

a full slot. What's more, unlike competing

products it works in the Compaq Portable and most clones. Easy diagrams show how you just place the card in an open slot, remove the original processor and connect a single cable. There is no software required. From that moment you are running faster than an AT

Second, they are advanced. The BREAKTHRU 286 replaces the CPU of the PC or XT with an 80286 microprocessor that is faster than the one found in the AT Has a 80287 math coprocessor slot for numeric intensive applications. A 16K cache memory provides zero-wait-access to the most recently used code and data. Speed switching software allows you to drop back to a lower speed on the fly for

ming sensitive applications. Third, you have full compatibility, All existing system RAM, hardware, and peripheral cards can be used without software modification. Our boards operate with LAN and mainframe communication products and conform to the Expanded Memory Specification (EMS). Software

compatibility is virtually universal Faster and smarter than an AT - PCSG guarantees it.

Fourth, these are the best. There are several other boards on the speedup market. We at PCSG have compared them all, but there simply is no com-parison. Many cards offer only a marginal speedup in spite of their claims and others are just poorly engineered.

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see, Lucid

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Memory Resident

That's because the idea of a memory resident spreadsheet makes sense, one that you can pop-up instantly while working in your word

Advertising

way we dreamed a spreadsheet would function. Everyone who has seen it says things like. "Lucid 3-D is how software of the 1990's will look and perform"

or even more to the point "This is the way I thought a computer should work".

way. Users say "It is so intuitive that I reallu don't need a manual." That's because we use something we call a visual command menu. Jim Seymour, the noted PC columnist, talking about Lucid in a recent article said that, "If there ever was an interface idea so good it ought to be stolen and widely used, this is it."

What he was talking about is a new menu approach that follows a simple design concept: it is easier to recog-



the widebar to that cell and press one key (grey +).

FIG. 2 Here we are instantly. Notice the lower left corner showing we are on level 2. You can go down or up. (See next page) processor or any other program. multi-dimensional. Any cell of the

F1 for help or \$10 for menu

Lucid lets you cut anything on the screen and paste it right into Lucid, or cut anything from a Lucid worksheet and paste into the application below. You can even run Lucid on top of 1-2-3 if you like, and cut and paste information from one to the other, including formulas.

Lucid 3-D was developed over the past two years with countless, exhaustive hours of planning and programming to produce something spectacular. This is a product that works the

spreadsheet can contain a complete other spreadsheet that you can access with a single keystroke. It is as simple as the pictures show. And you don't have to write formulas to do that All you do is go look at the other file, navigating through easy, point and shoot directories. When you come back up (with one key) the link is made automatically for you.

What

it so

Makes

Special

screen

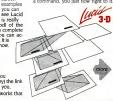
you can

is really

In the

Everything about Lucid works that

nize than it is to remember. As choices are made on a menu that take you to lower levels you always can see exactly where you came from and where you are going. The complete menu path is always visible. You cannot get lost several levels down. This means you never have to remember a command, you just flow right to it.



Any cell can contain a complete other spreadsheet that you can access with a single key.

Plus, no matter where you are on a menu or what you are doing, just press function key F1. and you will get a help screen specific to that command or action. Or if you want to know about any subject you can pop up an index of over 400 topics and select the one you want.

Notepad Behind Every Cell

Another 3-D feature is that any cell can also contain a multiple page note that you instantly access with a single keystroke. You can write



ent spreadsheet. You could now move to the New York Times and see the detail on that figure. There is no limit to the leve you can go. Move right down to transaction level if you like. notes, memos or letters that relate to

Lucid 3-D is truly revolutionary, it is fast, fast, fast! It is incredibly quick in performing calculations because it doesn't recalculate every cell every time you insert an entry, instead, it only recalculates the specific cells that are affected by your change. This is called minimal recalc. Lucid also has a remarkable innovation called background recalc in which you are given control of the cursor the moment calculations affecting your viewing screen are completed. Other calculations you don't see continue on in the background during the next commands. The end result of this powerful combination is you rarely wait for a recalculation with Lucid. You find out what instantaneous is all about.

your work, save them as individual files and even print them separately or with your spreadsheet

Lucid Learns

Lucid 3-D also lets you teach it any

combinations of keystrokes so that involved sequences

can be done with single keys. Plus more than just remembering keystrokes, Lucid allows you to create Macros with loops,

procedures and conditional branching amazingly all done automatically with simple menus. You can create your own menus that show the new features you have taught it. Another great feature is you can make your custom menus work like Lucid where one choice can take you down a level to a whole new set of choices. What's nice is that they will work from one spreadsheet to another.

El for help or E10 for mens Advertising

> FIG. 3 We want more detail, so let's go to Newspapers, just press the Grev + Kev

The best idea I've seen for a spreadsheet in years. 99 Jim Seymour, Columnist, PC Magazine, PC Week



Fig. 5. Of course, Lucid does multiple windows. Notice, you can simultaneously open windows in different rectories, different drives, even down as many as 3-D levels as you like. No one else can do that.

Mouseability

Lucid 3-D was designed for both keyboard enthusiasts and mouse lovers alike. You can take your pick. Designed around the mouse from the ground up, the interface is smooth and natural. You select files to load from directory lists. Everything is point and click. What's more, any Lucid 3-D menu selection can be "moused" and the response time is 'right now'' instead of the sluggish "a

little bit behind you" feel of add-on mouse menu systems like those you've seen with 1-2-3.



FIG. 6 We need those budget figures in the Word Perfect letter we are writing. Clipboard Dump does it right now.

A window pops up with a library of function names you can page through with the mouse. Select, click and it's in the formula with no typing required. You even have a label window that you can fill (from the keyboard) with favorite labels and names so that you can insert them later with the mouse. There's even a pop-up calculator to insert numbers so you don't have to go to the keyboard very often.

It really permits that feeling of becoming one with your work. Lucid 3-D has windows of user defined range names as well as the macros named by the user that can be selected just by pointing and clicking. Icons that are easy to grab with the mouse let you resize and move the spreadsheet window with the ease you would expect. Plus you can go anywhere on the sheet by moving the mouse and clicking on the spreadsheet borders. And remember Lucid is designed so that any of those features are done with or without the mouse easily and quickly.

When you are staking a big decision on information gained from a spreadsheet you need to be certain that you have made no mistakes. Lucid offers five audit displays and printouts.

Masterwork

We could go on at great length about all the features and innovations in Lucid, but Lucid is more than a bag of features. What is most important is the pride and craftsmanship that went into its creation. It is a master-

kers of LIGHTNING sk speed up software, and BFAKEBIN 285 Accelerator Board

FIG. 7 Here it is right in Word Perfect (or any word processor) Just like you typed lt.

You can go the other way just as easily

work. The overall feel is tight and polished. In fact, Paul Somerson, executive editor of PC Magazine, used one word to describe it. "Slide

James Johnson

IDEET JOHNSON, NP

to: Robert Smith

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we developed the BREAKER 200 accelerator board that blew everything else out of the water, and later we topped ourselves with the Breakthru 12. Now in 1987 those who have worked with Lucid 3-D tell us "you have

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LETTERS TO PC MAGAZINE



THE BEST OF %7

It looks as if Compaq has been paying PC Magazine too well for advertisements-at least well enough for you to pick both the new Deskpro 386/20 and the Portable 386 for the best of 1987 ("The Best of 1987 (and Some of the Worst)," PC Magazine, January 12, 1988). Of course I can't speak for everyone, but I think the IBM PS/2 Model 80 is a more complete machine and has everything both Compaq machines do not have. If not, then why didn't PC Magazine pick the Compag to face off against the Macintosh II ("Mac the Knife: Apple Cuts In on IBM," PC Magazine, November 24, 1987)?

> Ice Le Houston, Texas

The Compaq Deskpro 386/20 is not only faster than the Model 80, it's better-engineered and far more compatible with existing applications. Unfortunately, it wasn't shipping when we did the Mac II comparison.-Ed.

I heartily applaud your decision to name Nota Bene 2.1 one of the best of 1987 ("The Best of 1987 (and Some of the Worst)"). It is the only word processor for scholarly writers and is an excellent choice for anyone who is serious about producing lengthy documents. Nota Bene's strengths are substantial, and although it is not an easy program to master, any effort a learner makes is immediately and handsomely rewarded

> Peter Inst Philadelphia, Pennsylvania

In his review of XvWrite III Plus ("The Best of 1987 (and Some of the Worst)"), Craig L. Stark writes, "Enter the command XLT (translate). . . . " My attempt to use XLT resulted in an "Illegal Command" response, and I find no mention of an XLT command in the index of my Xy-Write III Plus manual. Can you please ex-

> Richard Diffenderfer Summit, New Jersey

I apologize for the error. The correct syntax is XLATE.-Craig L. Stark

In your best of 1987 feature ("The Best of 1987 (and Some of the Worst)"), Paul Somerson remarks that Microsoft Bookshelf contains some "fairly useless manuals tossed in to pad the thing out." On looking at the picture, I was amazed to find that one of these "fairly useless" manuals is The Chicago Manual of Style, the standard style manual for thousands of publishers, university presses, editorial services, and



word processing departments. Someone at the magazine should take Mr. Somerson aside and explain some of the finer points of the publishing industry.

If there is a problem with the package, it lies instead with the choice of The American Heritage Dictionary, since many potential users of the package prefer Merriam-Webster's dictionaries. Compatibility with the dictionary underlying one's

spelling checker would also be an issue for the serious editor or writer

Clyde Holler Atlanta, Georgia

Needless to say, I plowed through your fourth annual best-and-worst article ("The Best of 1987 (and Some of the Worst)") with fervor. When I came to the "Abort. Retry, Fail?" article, however, I spotted two very serious errors on Bill Howard's part. In this article, Mr. Howard awarded Ann Arbor Software two black marks for alleged lack of a printer driver in its word processor, Textra, Version 4, as well as for its subscription policy.

First, Textra does come with a generic Epson-type driver that can be customized very easily for any printer. This is a far superior solution to being locked into only the printer drivers that are supplied by the publisher.

Second, Ann Arbor Software's subscription offers gradual upgrades as it keeps working toward Version 5. I wish more companies took this nonvaporware approach.

Surely your intent is not to harm a small company that just happens to produce, dollar for dollar (\$29.95), more word proces-

sor than anyone else? Biom Billing Northvale, New Jersey

Good word-processing software hardly "locks you in" by providing you with drivers for all major printers. Ann Arbor Software apparently agrees: Version 5.0

(\$69.95) will include printer drivers.-Ed. Upon receiving the January 12, 1988, issue of PC Magazine, I carefully searched through "The Best of 1987" article and

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LETTERS

was surprised to see that you had omitted what has to be the very best of 1987. I refer to the three programs DR. COM, RN.COM, and CO.COM (Utilities, PC Magazine, August, September 29, and December 8, 1987). I can only guess that it was modesty that kept you from including them—but remember, it ain't bragging when it's true.

Alfred T. Barnard Jupiter, Florida

BEATING BILL

Congratulations to Bill Machrone for his column "Beating Up Bill" (PC Magazine, January 12, 1988). Sniping at peopel who are successful has always disappointed me. Standing up for them, as Mr.

 Although I had never even heard of the man, I thoroughly enjoyed the piece on Bill Gates by Bill Machrone.

Machrone has, is unfortunately unusual enough that I think it is worthy of thanks. I would remind the snipers that it is a lot easier to cut down a tree than it is to grow one. David H. Barnhouse Pittsburgh, Pennsylvania

I am a new computer owner, and although I had never even heard of the man, I thoroughly enjoyed the piece on Bill Gates by Bill Machrone ("Beating Up Bill"). It was well written and thoughtful, and I totally agree with the author's viewpoint. (That shows what good writing can do!) Joan M. Jones Fairfax, Virginia

The problem with Bill Gates is that he is a symbol of Microsoft ("Beating Up Bill"). When I had problems with a couple of Microsoft products, I called the company and wrote several letters but got no reply. So I sent another letter to Mr. Gates. Still no reply. If Bill Gates doesn't watch out, some

16-year-old kid will replace DOS and OS/2 with CD/UNIX/OS. Peter Brown

Savannah, Georgia Your column on Bill Gates is puzzling,

since PC Magazine has always steadfastly resisted chicanery in the PC industry ("Beating Up Bill"). The reason more and more people are beginning to feel uncomfortable about Microsoft is not because Gates is successful but because they percive a wide gap between the responsibility dictated by his "vision" and the mission he ascribes to hisself in the industry on one hand and the business practices of Microsoft on the other.

I'm not saying Microsoft is the worst company in the industry—it's not like Lotus, a company so repulsive in its deportment toward the industry with its lookand-feel suit—but it just does not live up to its proclaimed lofty standards. And most people tend to dislike sanctimony.

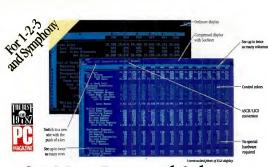
S. P. Hariton Brooklyn, New York

A DIFFERENT DOS

After reading your article concerning DOS 3.3 and its last of the DEBUG and EXE-ZBIN programs, I was all prepared to proceed with the programsing changes that conceed with the programsing changes that January 12, 1983). My preparation changed to condision, however, when lease of the programsing changes to lease the programsing the lease of the programsing the processing the lease of the lease of the lease of the lease to lease the lease of lease the lease to lease the lease to lease lease the lease lease

Michael Herman New York, New York

Computer writers, like computers, handle wheir input and output quite literally. The instructions that appeared in the User-Journal Development of the Computer Column was specifically for patching the IBM PC-DOS 3.2 version of EXE-BIN. COM to work under versions of DOS 3.2 and later. The PC Tutor column in the same issue noted that the version of EXE-BIN. COM included in IBM PC-DOS 2.1 will run under later versions without modification—EX



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LETTERS

ATLAST

Quick Looks, in the January 12, 1988, issue of PC Magazine, leads off with an article titled "At Last, Search and Replace for 1-2-3" (First Looks, page 56). You took the words out of my mouth.

My company recently published a Lotus 1-2-3 add-in called @LAST, which performs search-and-replace functions in 1-2-3 spreadsheets. The add-in will find and/or modify values, formulas, and labels. It will also search out formula cells that have resulted in errors (signalled by ERR in the display), and users can choose the direction of the search, case sensitivity for labels, and verified or nonverified global mode. The product is being marketed as shareware and so should be available on local computer bulletin boards.

Alan Wassyng Thornhill, Ontario Canada

LOCKSMITH LIVES ON In his article "Coping with Copy Protection" (PC Magazine, November 24, 1987), Henry Fersko-Weiss states that

Locksmith from Omega Microware is no longer sold and that the company is no longer in business. I would like to inform Mr. Fersko-Weiss and your readers that Alpha Logic Business Systems of



Woodstock, Illinois, currently distributes Locksmith/PC and Locksmith. Version 6.0, for the Apple II. Although all forms of copy protection may disappear shortly, the many features these programs have given us will always be appreciated.

Brian L. Jones Glenview, Illinois

For more information regarding the Locksmith products, contact Alpha Logic at (815) 568-5166.-Ed.

NORTHGATE TO THE TEST

Regarding your review of the Northgate 80286 ("The Cheapest ATs Ever," PC Magazine, February 16, 1988), we are very concerned about some of the conclusions drawn

Fit and finish: Our cases were slightly wide at the drive rail slots. Two washers fixed that on early production, and we have changed suppliers to eliminate the problem

Hard disk drive performance: Northgate uses a very reliable, low-cost drive and enhances the performance with RLL encoding, 1:1 interleave, and a high-performance 16-bit controller with a considerably higher data transfer rate. This combination beats the 40-millisecond drives and approaches the performance of 28-ms. drives. As disk caching becomes more prevalent (Northgate is currently shipping it on its 80286 and 80386 systems), the seek times you used will become meaningless.

Also, your reviewer questioned whether we provide complete documentation. Northgate ships MS-DOS 3.3 and GW-BASIC with every system.

Arthur B Lazere President, Northgate Computer Systems Plymouth, Minnesota

PC Labs tested drive throughput on all the machines in this review, and Northgate's 80286 was the fastest, despite the slow head seek. Mr. Lazere's point is a good one; we will be replacing the disk seek test with throughput-oriented tests.-Ed.

CORRECTIONS/AMPLIFICATIONS

Polygot Inc.'s Jet:Spell does not require a Hercules- or EGA-compatible adapter (PC Advisor, PC Magazine, January 12, 1988). Jet:Spell uses the extended ASCII characters to represent all the foreign language characters it supports.

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amond as last as ecusing a may one:

What's more, you can work on an as alway files, or portions of files, as you like an amany files, or portions of files, as you file and the second of the second

WINDOWS ON THE WORLD. Why the excitement? First, BRIEF's architecture. Any number of files of virtually any length can be open. (Start BRIEF with " * * to prove it) Open as many tiled windows as fit the acreen-over Ainder and side-by-side-to work on any of your files. Open, close, and resize windows as you go. In each window, full screen or tiny, all editing techniques are at hand-high-speed cursoning, paging up and down, horizontal scrolling, optional word wrap Load the same file in any number of windows to view different areas simultaneously. A change in one changes all. Cut and paste tex blocks between windows and files, or into but fers for later recall. All files stay in memory, so you can always go back to snip some more

UNDO. NOT UN-DELLETE. Don't contain the two. BRUEF doesn't just keep sagasthes of recent deletions should you want to pick them up from the cutton room floor. It was made that affected the cutton or the text. Watch it undo a global replace, for ocample. Uncarray, It can back up 300 times, all the way to the beginning of a sees son. "Works like a dream"; and The C Journal.

BEILLI GAMES. Leave BRIEF, run you cropiler, print out the effect measure, look up BRIEF assum? No way? Run you complete from made BRIEF? It will poet to each arror line in your source program, still loaded in memory, for unmediate editing. You don't have to leave BRIEF to use OS either. BRIEF assume that the program of the program of

The You were working on:

KEY WHIZ. You can reassign BRIEF's command keyhats to whatever keys you're used to, even your old editor's, so you'don't have to send your fingers back to school. Macro execution can be assigned to school. Macro execution can be assigned to sangle keys. Or you can tell BRIEF to histen while you tap out a complex routine. It will some and judyback faithfully, a shortcum sucre.

without a single line of coding

MINITA-LINGUAL. BRIEF's macro
language is perfect for writing formatters for your language which indeed,
match up parentheses and brackets, and set
up statement templates for fill-in. BRIEF comes
with C language support already built in
Others have writinen macros to format Pascal,
BASIC, LISP, Proton, FORTRAD.

OUICEER PICEER UPPER. Lookup for somehung's REIF has fall UNIXand find and fire any file in memory. Liferal strsign with widecards and "?" character masking, sure. Bit also indifference to case or tastervering characters, [seeou] to match all viewels,
of [- seeou] to match saything but vowels,
of [- seeou] to match anything but vowels,
or [- seeou] to match anything but vowels,
or [- seeou] to match anything but vowels,
or [- seeou] to match anything to vowels,
or [- seeou] to searches, even multiple choice

REASONS 11 THROUGH 20: 11. BRIEF comes with a color option You can select your own color scheme anytime. 12. It supports EGA's 43-line

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language, grobs hold of BRIDF and turns it not occupied BRIDF and turns it not occupied BRIDF under BRIDF underlying shell characteristic BRIDF underlying shell characteristic under BRIDF underlying shell characteristic unit bit brazes, plus disARSE steel, and link to the Cispper I'M, Foubsier - I'M and Quickaiver completes, all with dBRIDF and and and unit to the Cispper I'M, Foubsier - I'M and I loaded end running the show it can do what BRIDF mixed yours plus in the Cispper I'M, Foubsier - I'M, and I'M, and

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mode and can deplay up to 18 lines long. JL 18 lines I long. I long to the categories set can slow on screen. It, Full poth hap can be set to the categories of the cate

Much of BRIEF was writteen in its own macro lanquage and its own pacro lanquage and its compiler come with quage and its compiler come with macro, with source code for learning by example it is a complete language with conditionals, loops, recursoon, global and toloops, recursoon, global and couvariables, even distin types it comcorrior files, windows, and the acter variable names, and—not at all like 12-3** cunedom—is en-

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dBC Identical dBASE III Plus Files Using C d BCTM is a sense of C libraries from Lattice which creates, accesses and updates files identical to those of dBASE self. So dBASE can read and update the

What for? It means both C and dBASE applications can operate on the same data bases interchangably it means C programmers can interface with the big programmers can interface with the big market of dBASE users out there, yet side-step the dBASE language. It means dBASE applications can now be linked to the universe of C libraries and tools to add windows, graphics, statistical analy-sis all the things dBASE cannot do ft means the speed and power of C to mdBC's functions parallel all dBASE's file handling commands, many decomposed

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PC ADVISOR



Help in installing a quieter power supply, in setting up communications in the background, in getting the most out of bar charts, and in choosing a dictionary with definitions.

QUIET COMPUTING

I'm happy with my XT, save one annoyance: the noisy fan in the power supply. I often get the impression that a typhoon is constantly blaring in my ears. Does anyone make a less-noisy power supply?

Enrico Del Scalpel Conception Valleyfield, Quebec Canada

PC Cooling Systems (Bonsall, Calif.; (619) 723-9513) markets a line of replacement power supplies designed to cool your system mare quietly and effectively.

For your XT, you'll want one of two models offered for \$149. The \$Q150 PC/XT operates at roughly 16 percent of the noise level of the XT s stock power supply and eliminates 40 percent more heat; the TC150 PC/XT is 50 percent quieter, and eliminates twice the heat. Both models provide 158 wants of power.

The \$169 SQ200 AT—a 200-watt model for ATs—provides cooling equal to that of the AT's stock power supply but operates at 31 percent of the noise level.

BACKGROUND COMMUNICATIONS

I now use a software package that, at a specified time, will dial a remote data collections device and download data to my hard disk in unattended mode. However, while the program is running the PC cannot be used for anything else. Is there a RAM-resident program that will dial up a number unattended but that will wait until nothing else is running on my PC.

Stephen C. Nodvin Bangor, Maine Your application begs for a communications program that can operate in the background. Program that run in the background carry out their duties while you go about business as usual on your PC. You write 'scripts'—short programs writen with commands the package provides—that tell the program when to dial and what to do the

When the program begins background operation, you may notice that whatever application you're running in the foreground slows down a touch; whatever you are running in the faceground must share processor with what's running in the background. But running your application programs at a slightly reduced speed beats and being able to run your application pron being able to run your application pro-

Relay Silver (\$150; VM Personal Computing Inc., Danbury, Conn.; (203) 798-3800) rates as probably the most powerful and trouble-free communications package

■ PC Cooling Systems

markets a line of replacement power supplies designed to cool your system more quietly and effectively. capable of background communications. However, it occupies a substantial 197K RAM of your system memory running memory-resident, so you'll need at least 640K RAM to run it behind any significant applications.

As is usually the case with software, there are other similar packages that may sail your particular needs better. Lotus Express, for example, reigns as undeniable king for MCI Mail users. Turn to our most recent feature on background communications: Invisible E-Mail," PC Magazine, May 12, 1987 for a detailed look at what Relay Silver and the other packages have to offer.

BAR CONTROL

I have been looking high and low for a graphics program capable of displaying bar graphs in which each bar can be controlled individually in terms of width, not only height. This feature is critical when displaying data sets of varied significance. Lotus 1-2-3 compatibility would be a plus. Do I really have to return to my graduate school mainframe to get this very basic feature?

Paul A. Miller Deerfield Illinois

It sounds as ifyou're trying to graph threedimensional data on a two-dimensional graph. If you're determined to do this, however, your best alternative may be a graphics package that includes freehand drawing capability. For instance. Hewlett-Packard's

■ PC ADVISOR

Graphics Gallery (\$695: Palo Alto, Calif.: (800) 367-4772) includes two separate packages-Charting Gallery and Drawing Gallery. After importing a graph from Lotus 1-2-3, you can then use Drawing Gallery to expand or shrink the width of the individual bars. Though not as graceful or easy to use as many graphics programs. the Graphics Gallery offers excellent control over the appearance of graphs.

With any freehand drawing package you'll probably spend more time than you'd like getting your graph just right. Instead, consider opting for a true 3-D graphics nackage. You'll get your graph with a lot less effort, and chances are the graph will represent your data more intuitively.

Boeing Graph (\$350; Boeing Computer Services, Seattle, Wash.: (800) 368-4555) offers a plethora of three-dimensional graph types you can generate in minutes. The package includes its own three-dimen-

Lotus 1-2-3 is a cinch. A variety of options let you manipulate the look of the graph, giving you control over attributes such as the viewer's angle of perspective. Such extras make the package both powerful and fun to use.

MORE ON-LINE DEFINITIONS

In the January 26, 1988, PC Advisor, we looked at two dictionaries, complete with definitions, that you can install on your hard disk-ABC Word and Funk and Wagnall's Standard Desk Dictionary. A third product-Jorj (\$39.95; Jorj Software Co., Manchester, Mich.: (313) 428-8010)-may prove to be a better choice for users of systems short on memory and/or hard disk space.

Jori contains only about 55,000 words. as compared to the 87,000 of ABC Word and the 100,000 of the Standard Desk Dictionary. And, whereas the other products sional spreadsheet, and data import from provide full definitions. Jori definitions vou are using

usually consist of only a few words and apply to the root word only (you don't get separate definitions for each inflection of each word).

But Jori's streamlined approach makes it practicable for use on systems with little memory or free disk space. Jory requires only 3/4 of a megabyte of storage on your disk, compared to 5.5MB for the Standard Desk Dictionary and IMB for ABC Word. And Jorj requires only 65K RAM to operate in memory-resident mode, as opposed to the 214K RAM needed by ABC Word (Standard Desk Dictionary cannot run in memory-resident mode at this time). Jori also includes a helpful phonetic word search ability.

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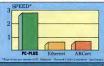
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 and all journals
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 accumulates 340, 941, W2 and state tax information produces immediate employee reports on screen or printer including W2 forms, employee mailing labels, payroll journals, QTD and YTD reports of earnings & deductions, and employee record reports.

ACCOUNTS RECEIVABLE

Decoupting and the property of the property of

prints computerized invoices or supports manual invoicing prints computerized customer statements with remittance stubs

ACCOUNTS PAYABLE

uses open invoice method to keep track of full or partial payments against any supplier invoice

fully pald invoices may be purged or retained

automatically updates inventory records, project records and ledger

accounts

accounts

user can define aging periods

produces immediate vendor reports on screen or printer including
mailing labels, aged summary and details, and payables journal
mailing labels, aged summary and details, and payables journal
required for program input
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LE FIRST LOOKS

SideKick Plus Goes Beyond Traditional Supporting Role



Borland International's Side-Kick brought instant gratification to the PC. You hit a hotkey. and boom, you had access to a calculator. And a notepad. And an auto-dialer. All without leaving your foreground application. SideKick's memory-resident tools quickly became basic equipment on American business desktops.

More than a million copies of this granddaddy of all TSR utilities have been sold, and many more have been given away with memory cards and other hardware.

A multitude of competing



SidcKick Plus running on top of Lotus 1-2-3. The Calculator, at right, keeps a running record of your arithmetic; the Time Planner, at left, can give you a daily or monthly calendor, or it can diagram your week's appointments. At the bottom of the display, Side-Kick Plus reminds you of the function key assignments

TSR productivity tools have followed. Some, like Lotus's Metro, are based on SideKick's 'desktop organizer'' concept, while others are built on one component, like the calculator

or the notepad.

Four years after introducing SideKick-which will remain available-Borland is now debuting SideKick Plus. With many new features and a host of enhanced capabilities, SideKick Plus is a veritable pop-up envi-

SideKick's notenad, calculator, calendar, and ASCII table are all part of SideKick Plus, and each has been greatly enhanced. SideKick Plus's new features include an outline pro-(continues on page 34)

Apple LaserWriters: Faster PostScript Printing for Less

HANDS ON BY MITT JONES

After years of peddling its LaserWriter Plus-a jewel in its day but a 77-pound behemoth now-Apple Computer is finally shipping its latest and greatest generation of PostScript printers: the LaserWriter II line. Like the LaserWriter and Laser-Writer Plus, the LaserWriter II printers can be hooked to a PC's serial port via a null modem cable to deliver PostScript output.

The LaserWriter II line in-

cludes two models that can print from a PC-the LaserWriter HNT and the LaserWriter HNTX. The \$4,599 HNT is the closest thing to a replacement for the LaserWriter Plus, offering roughly the same features in a faster, smaller, less-expensive box. The HNTX adds a faster processor and a few other goodies, pushing its price to \$6,599.

Both new printers are based on the 8-page-per-minute, 300dot-per-inch Canon LBP-SX engine, making them a mercifully light 45 pounds as com-pared with the 77-pound Laser-

Writer Plus. The new chassis looks sleek compared with its boxlike predecessor, thanks mainly to its shorter design. But the HNT and HNTX actually measure wider and deeper than their predecessor. The bigger news, however,

is the speed improvement over the LaserWriter Plus. Our Post-Script printer performance tests showed a drastic difference between the IINT and the Laser-Writer Plus Part of the difference results from the HNT's use of a more recent version of the

(continues on page 35)

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SideKick Plus (continued from page 33)

cessor (called Outlook), a file manager, and something listed on the main menu as "services." The services feature reflects one of the biggest changes

in SideKick Plus. The individual applications in the package have been redesigned for a much higher degree of integration, and the services menu has functions that aid in the flow of data among the different components of SideKick

You will immediately recornize SideKick's familiar text editor, or notepad, but a crucial difference is just as immediately obvious. SideKick Plus has nine notepads instead of just one, so you can have up to nine files available and ready for editing at any time.

Also, you can attach notes to other SideKick Plus applications in a variety of ways. A note can be associated with an entry in the phone dialer, or with a line in the outline processor, or with an appointment schedule in the time planner.

SideKick's calculator has been replaced by four separate calculators in SideKick Plus. There are different interfaces for business, scientific, programming, and formula calculations

The business calculator handles standard math, in addition to functions like future value and compound interest. The scientific version supports trig and log functions, and the programmer's calculator has functions for software designers.

The formula calculator does everything from natural logs to standard deviation. It's basically a small library of common formulas that are no fun to eval-

uate on paper

None of the calculators use the "pocket calculator" metaphor that Borland designed into SideKick. Each interface consists of a small lower window that mimics a calculator display and a larger upper window displaying an electronic "tape" that gives a visual readout of calculations as they progress. The tape is actually a dedicated note from the notepad, and it can be edited and searched just | like any other note.

SideKick's phone dialer has also been substantially improved in SideKick Plus. Much more than just an electronic Rolodex, the dialer may be all the communications software you

will ever need There is a dumb terminal mode, and communications can be run in the background. The dialer also has a simple, easy-

to-use script language. I developed a script for MCI Mail by simply recording the keystrokes from an MCI session, using the dialer's "learn" feature. The results had to be lightly edited, but the whole

process took only a few min-Script editing is a simple matter of just popping up a special note that automatically records the script. You can also

associate a text note with any phone number entry that is in

publish specs so that programmers can write their own Side-Kick Plus applications. If the response is anything like that generated by Lotus's add-in manager, SideKick Plus could become something akin to a

complete memory-resident opcrating environment. SideKick's calendar has been upgraded and renamed in SideKick Plus. The Time Planner, as it is called, adds multiple alarms and network features to the calendar. Once again, the

notepad is also present. A note can be attached to each day's agenda and popped up anytime that agenda is onscreen

Outlook, the outliner, is the most intriguing of SideKick Plus's new applications. It allows you to view an outline from many different perspectives

Your outline is entered using preset tab stops to logically dis-

dowDOS, from WindowDOS Associates), it's there only when you need it. The file manager's main window can display a directory

or search for a file name anywhere on your disk. You can also use the file manager to view a file in ASCII or hexadecimal format. None of its basic DOSshell functions are all that earthshaking, but the file manager contributes to SideKick Plus's high degree of integration. Anytime a SideKick Plus ap-

plication prompts for a file name, entering a wildcard pattern or a nath name automatically pops up the file manager, so you can search for the appropriate file and then point and shoot. The file manager feeds the file name to the SideKick Plus application you are using, then goes away

The file manager also formats disks, thus solving one of the more frustrating data-transfer dilemmas of the eighties

A vastly improved, contextsensitive help system makes SideKick Plus's intimidating array of features much easier to contend with. Some of the individual help screens are a bit terse and limited, however.

With all of SideKick Plus's added power, it makes sense that there have to be some tradeoffs, and there are. For one thing, it takes noticeably longer to pop up and down than plain old SideKick did. When you hit the hotkey.

you are entertained by a couple of ticking sounds from your system speaker before the main menu pops up. The same thing happens when you pop back to the foreground. I found this a bit annoying, since, on an XT clone. I was able to type a few words while waiting for Side-Kick Plus to return control of my screen to the keyboard.

speeded up by climinating applications that you don't want. The install program allows you to pick and choose among the SideKick Plus applications, including only those that you plan to use. As you build your customized SideKick Plus, the install program displays a running total of the RAM and disk space (continues on page 36)

The program can also be

play text. Once an outline has been entered, tapping the Minus key hides all of the text indented to the rightmost tab stop. Any spaces between lines of the outline are closed up. By hiding successive levels, you can reduce the outline to its essentials-just the main points. Then, by tapping the Plus key, you can reintroduce each level

Another application new to SideKick Plus is the file manager. As its name implies, it is basically a DOS shell. But since it is memory resident (like Win-



A full-script language, with automatic recording, is included.

the dialer's database.

Storing a phone number in the dialer is simplified by a popup data entry screen. You just fill in the fields, including an "index" keyword, for each dialer entry. The keyword can be

used to search for a number. To dial a stored phone number, you simply point and shoot. Scripts associated with a phone number can be executed in the same simple, point-and-shoot

But this pop-up will not be limited to the modules that you buy with it. Borland will soon

Apple LaserWriters (continued from page 33)

PostScript interpreter-Version 47.0; the LaserWriter Plus we tested it against used an older. slower version.

But the bulk of the speed difference results from the IINT's zero-wait-state operation. While both the LaserWriter Plus and LaserWriter IINT run the same Motorola 68000 processor at 12 MHz to handle the heavy PostScript processing load, the Plus must insert a wait state into memory accesses. Apple eliminated the one wait state of the LaserWriter Plus by using faster RAM in the IINT.

Other notable improvements of the HNT over the Laser-Writer Plus include an additional 512K RAM, bringing the total to 2MB. Out of this 2MB of RAM, about 750K RAM may be used for font caching. The LaserWriter II line includes the same 35 resident fonts shipped with the LaserWriter Plus

The NTX drastically improves speed by using a 20-MHz 68020 processor instead of a 12-MHz 68000. The IINT can be upgraded to the IINTX by inserting a new controller board. That upgrade will cost you \$2,499 and must be installed by an Apple dealer. Aside from the gain in speed, the IINTX also offers greater memory capacity (up to 12MB) and the ability to add dedicated

Apple LaserWriter HNT



Our constitution is in actual operation; everything appears to promise that it will last;

but in this world nothing is certain but death and taxes. Courier Bold Underline

Palatino Bold Underlined Ital. Type: Laser (PostScript) Engine: Canon LBP-SX

Max, paper width; 8.5 in. Price: \$4,599 SPEED (ppm):

Rated-8 Tested-7.4

CONTROLLER: 11.5-MHz 68000 THE ALROW 2MB of RAM (expandable to 12MB)

TYPE PITCHES: Variable FEATURES: Resident lonts

ITC Avante Garde-Regular, bold, static, bold static ITC Bookman-Regular, bold, raisc, bold static external hard disks. As many as |

seven SCSI disks can be daisychained for storage of downloadable fonts. This gives you enough storage to save the actual bit maps of your fonts permanently on disk, saving you the time of regenerating the bit map each time you want to use the

Courier-Regular, bold, italic, bold

Helvetica-Regular, bold, rialic, bold Helvetca Narrow-Regular, bold ratic, bold italic New Century Schoolbook-Regular bold, italic, bold italic

Palating-Regular, bold, rialic, bold Symbol-Regular Times Roman—Regular, bold, static, bold italic ITC Zapl Chancery-Regular

ITC Zapl Dingbats-Regular COMPATIBILITY. IBM character set: Low Graphics: PostScript Text: PostScript, Diablo 630

font. And believe it or not, the HNTX also includes an HP LaserJet Plus emulation.

Apple literature puts the LaserWriter HNTX at up to four times the speed of the Laser-Writer Plus Our evaluation unit test IINTX performance

After years of nearly ignoring DOS machines in the Laser-Writer manual, Apple finally includes a full section in the LaserWriter II manual on using the printer with DOS machines. The 15-page section is relegated to the appendixes, but at least its there. You'll find pin assignments for the RS-232 connector and sample programs for changing the handshake and checking the printer's status.

The LaserWriter IINT is an excellent choice if you're leaning toward a PostScript printer. The price is right, memory and internal fonts are ample, and the ability to upgrade to a HNTX keeps your options open. And don't worry. The multicolored. bitten-apple logo might attract curious stares and coworkers may accuse you of being a radical. But the last I heard, IBM still can't void your warranty if you connect an Apple peripheral to your PC. List Price: Apple LaserWriter IINT, \$4,599; Apple LaserWriter IINTX, \$6,599; upgrade kit for IINT, \$2,499. Dimensions (HWD): 8.6 x 20 x t8.5 in. Weight: 45 pounds. Apple Computer Inc., 20525 Mariani Ave., Cupertino, CA 95014; (408) 996-1010.

CIRCLE 440 ON READER SERVICE CAR



Performance Tests: Apple LaserWriter Plus vs. Apple LaserWriter HNT

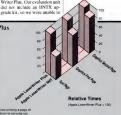
The Apple LaserWriter IINT proved 40 percent faster on text chores and 20 percent faster on graphics work.

Performance Times (Times given in seconds)

Apple LaserWriter Plus 14.6 9B.3 Apple LaserWriter IINT 8.1 74.0 35.3

The Text Page test speeds were obtained by timing the printing of ten copies of a two page business letter. The printing of tan copies of a two-page business letter engle-spaced business letter contained 2,888 racters and called for one PostScript font. The times

The Graphics Page tests required printing e.g. mixed graphics and taxt. In addition to carrying out generated the same six PostScript fonts of vancus typestyle and size. The increased speed between the first and second pages revails the time savings earned once



The Seikosha SBP-10AI: At 421 cps, It's The Fastest Dot Matrix PC Printer Around

HANDS ON

BY JONATHAN MATZKIN Two things about Seikosha

America's SBP-10Al stand out immediately: (1) it is by far the fastest dot matrix printer PC Magazine has ever tested, and (2) it costs \$4,495. Before you tell yourself that the one thing you don't need is a \$4,495 dot matrix printer, read a little further. The SBP-10A1 isn't for desktop installations (there wouldn't be much desk left). but for departmental workhorse use, it could be a standout performer.

At 421 characters per second in draft mode, the SBP-10A1 is as fast as dot matrix printers get today. That rate translates to 6.3 pages per minute, which is certainly competitive with many laser printers.

Of course, you don't get laser-printer output quality from an 18-pin dot matrix, but the NLQ output from the SBP-10A1 is quite satisfactory. Your best correspondence would be better served by a laser printer, but the SBP-10Al will handle everything else respectably.

It's flexibility, though, that makes the Seikosha an alternative to lasers. First of all, the SBP-10Al handles wide-carriage fanfold paper, something that no laser has managed to do.

In fact, the Seikosba has a total of seven different paper feed options. Fanfold paper can be front, back, or bottom loaded. In addition to the tractors. which adjust for push or pull operation, the SBP-10AI supports two cut-sheet cassettes for letterhead printing. There's a manual-feed slot as well. Paper parking lets you switch from cut-sheet to fanfold stock without having to reload.

The plethora of features goes beyond paper handling. The SBP-10Al has nearly every feature you would expect to find on a dot matrix printer.

It emulates the Epson Esc



Our constitution is in operation; everything to promise that it wil but in this world noth ertain but death and ta Draft Bold Under line Co. Elite Bold Underline Compressed Proportional Bold Underit

Type: Dot matrix (18 pins) Carriage width: 14 m. Price: \$4,495

ted: 800 Default 421 TYPE PITCHES (cpl): 10, 12, 15,

SOUND LEVEL (decibels): Tesled: <75

Printing: Bold, double-strike, NLQ sub-superscrip), underlining Formatting: Centered, double height letters, horizontal tabs ustified lines, proportional spacing, variable line height,

> COMPATIBILITY: IBM character set: Low and high Graphics: Epson FX senes, Epson MX-80, IBM Prognoter Text: Epson FX senes, IBM

the paper is advanced so you can see what is going on at the printhead. When you release the button, the paper is returned to its original position and you can

resume printing.

Obviously the SBP-10AI is intended for networks and other multiuser applications. It lacks a few features-built-in printer sharing and a buffer larger than 64K-that would make it more appealing in the multiuser milieu. But it provides a good combination of versatile paper handling, speed, and print quality. It's worth a look if you are seeking a large (10.7 by 26.4 by 19.1 inches (HWD), 72 pounds), powerful workhorse for office printing. List Price: Seikosha SBP-10AL \$4,495. Seikosha America Inc... 1111 MacArthur Blvd., Mahwah, NJ 07430; (201) 529-4655.

DIRCLE 442 ON READER SERVICE CAR

Proprinter commands. These emulations are resident in a cartridge that sits in a slot hidden under a cover on the front panel. There are three additional slots for font cartridges; a Courier cartridge is standard. One ingenious feature, a

commands as well as the IBM

"visible line feed," eliminates the guesswork in trying to figure what is on the page at the printhead. At the touch of a switch.

SideKick Plus

your configuration requires. SideKick Plus introduces few, if any, features that are in and of themselves revolutionary. What makes this program a winner is the way the features are chosen and presented. The notepad and the file manager knit the entire package together. It will be interesting to see what new and innovative applications

are written to the programming

spec that Borland will publish

for the module manager.

FILE SideKick Plus

Borland International Inc 4585 Scotts Valley Dr. Scotts Valley, CA 95066 (408) 438-8400 List Price: \$199.95. No

upgrade from SideKick, although Borland will send out rebate coupons for a discount on SideKick Plus purchases to registered SideKick users. Requires: 384K RAM, hard

disk. DOS 2.0 or later. In Short: A completely new pop-up that picks up where SideKick left off: has a calculator and a notepud like the original. but adds communications with Xmodem transfer, an outliner. and the capability of accepting new modules in the future. Not copy protected. CIPCLE 441 ON READER SERVICE CARD

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with capability. And credibility.

GLYPHIX				
HP		' '	\	
Bitstream	$\overline{}$		À	YES
FONTS TO 60 POINT	YES	NO	Z	YES
FONT SCALING	YES	NO	Z	14
DEGREES OF BOLD	2	2	1	YES
PATTERNED FONTS	NO	NO	Z	YES
300 x 300 DOT QUALITY	YES	YES	Z	:16
TIME TO CREATE 30 POINT FONT	1:34	_	Z	\$9995
PRICE	\$19500	\$20000		

nrough the pearly gates. The Basics is a collection of four Chancelor is a decorative face

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Telephone ...

Funk Utilities: Lots of Lotus 1-2-3 Tricks, If You've Got the Memory



Until now, add-ins to Lotus 1-2-3 have tended to unite an entire application with 1-2-3. Now Funk Software has packed a big bag of small tricks into The Worksheet Utilities which adds onto 1-2-3.

Funk is confident that 1-2-3. Release 3.0 (which ships later this year), will still need the utilities it's packing into this tool kit. (Lotus has pledged to maintain support for add-ins in new versions.) The package contains both a powerful tool kit to supplement 1-2-3's commands and a DOS disk manager.

The Worksheet Utilities is supplied with a program that copies its files to the 1-2-3 directory. It also installs Lotus's Add-in Manager and adds its modules to the list of valid addins. You assign Alt-F7 through F9 as hotkeys to pop up the utilities in your spreadsheet, or you can use the Add-In Manager to

The package includes Cellworks, the tool kit, and Fileworks, the disk manager. Each can be loaded separately, and they use memory only when you activate them with the hotkeys. Besides the 32K needed to attach them, the modules use

attach to them



Fileworks lets you enter a description, keyword, and operator name for any file in the system. It also displays file attributes and the amount of space left on your hard disk,

memory only when activated. However, they use almost 180K when certain parts of both programs are loaded

When you press a hotkey combination. Cellworks pops up with a menu of five utilities. With the Autosave feature, you tell Cellworks to save your spreadsheet to a temporary file at any interval from 1 to 999 minutes. It can also restore the backup file and force a backup sooner if you need one. The Search-and-Replace feature helps you find any text, formula, number, or address and replace it with something else.

than one column at a time The Formula Editor is the powerhouse of Cellworks. To modify a formula, you place the cursor on it, invoke the hotkey. and select F. The entire formula is displayed in a box on the screen. As you enter or edit functions, Cellworks displays a help screen with the syntax of

the function and the argument that you are working on. The PgUp key highlights parenthetical expressions. The FR key changes addresses to range names, while Ins and Del cut and paste portions of the formula. F9 lists the value of each Range Column Width helps component in the formula until you change the width of more the expression is fully calculated, making complex formula debugging a snap.

The PrintSet feature displays all print settings on one screen, and you can modify them easily. PrintSet comes with printer profiles with libraries of predefined printer setup strings. You can call up a setup library to select the string you want. You can also add your own setup strings and save them in the library

Fileworks clears the entire screen when it's invoked, displaying a Lotus-style menu with a list of the files in your data directory. It includes functions that you'd expect in a DOS shell, such as copying, deleting,

and moving files, as well as directory listing and control. You can operate on more than one file by moving your cursor to a file and typing the Plus key to tag it, by typing function keys to select all files or none, or by using the List function to tag based on a search of the contents of your files.

Fileworks' spreadsheet-specific functions speed your use of 1-2-3. You can save and retrieve files that you've displayed, and you can turn on file compression to reduce the size of the worksheets. A Peek function opens the highlighted file and lists range names, cell labels, and print headers for a worksheet. For nonworksheets, you'll see all text strings in the file with the control characters suppressed. You can add keywords, descriptions, and owner names to files that can be used as filters for a list or as keys for a sort. Fileworks can also create an archive area to move old worksbeets out of a data di-

The documentation for The Worksheet Utilities is outstanding. The on-line help is very detailed and a pleasure to use.

The Worksheet Utilities is a well-written and impressive library of functions. The package adds functionality to 1-2-3. making it a good addition to your spreadsheet repertoire if you can afford the memory requirements.



The Worksheet Utilities Funk Software Inc. 222 Third St. Cambridge, MA 02142 (617) 497-6339 List Price: \$99.95 Regulres: 512K RAM (640K RAM recommended if all the utilities are used); two disk drives: Lorus 1-2-3. Release 2.0 or 2.01: DOS 2.1 or later. In Short: A 1-2-3 add-in with powerful spreadsheet enhancements and DOS shell utilities. Not copy protected. CIRCLE 435 ON READER SERVICE CAR



As you type (a functions, Cellworks displays a window explaining the function and its syntax. You can also use the Formula Editor to edit long formulas and find ranges.



Disk Optimizer. The original un-fragment software now has un-format. Un-believable!

It's still the safest, most effective way to put the zip back in hard disk performance.

For more than two years now, Disk Optimizer has helped PC users everywhere safely restore and maintain the smooth, slick, fast performance of their hard disks.

And now there's a new and improved Disk Optimizer that un-fragments files even more effectively. And includes enough additional disk management tools to make it one of the best software values anywhere.

So, who needs Disk Optimizer, anyway? Simply everyone who owns a hard disk and relies on the speed and convenience it gives them.

That's because DOS is constantly slowing your hard disk down. It does it by breaking files up into pieces. Storing differ-ent chunks in different places. And that makes everything slower - loading, sorting, retrieving, backing up - because your hard disk has to chase all around to read and write different pieces of your file.

Disk Optimizer restores the speed of your hard disk by putting files back together in one contiguous piece - where they belong.

Disk Optimizer is absolutely, positively

"disaster proof."
It's sad but true. Some other unfragmenting software could lose your data if something goes wrong in the process. Like a routine reading or writing error. Or even a power failure.

But have no fear with Disk Optimizer. Nothing will go wrong because nothing can go wrong. Even if you yank the plug from the wall in the middle of the program. It's because only Disk Optimizer copies each file, piece by piece, then checks the newly un-fragmented version for completeness. Only then does it go back and erase the fragmented version. Not power spikes, disk failures or DOS errors-not even earthquakes - can cause data loss. And only Disk Optimizer makes you that promise. So why trust your disk to anyone else?

It's like a precision tune-up for your disk. In addition to un-fragmenting, Disk Optimizer also lets you quickly choose the optimum layout for your disk. So your most-used files have the fastest access. And program and other unchanging files can be permanently un-fragmented and set aside on their own area on the disk.

The simple menu makes it a snap Un-format - one of the powerful new reasons to buy Disk Optimizer

Oops! Make a simple mistake at the keyboard and you could wipe out your hard disk with a DOS Format command. But don't worry, "Un-format" will recover your entire

disk, and all your data, in just moments. It's included with your new Disk Optimizer. Plus, you get the new "Analyze" program with a graphical display that shows your disk's

condition so you'll always know when it's time to optimize again. You also get "Sorts" for organizing directories for the best appearance and sequence. "Findfile" for searching out hard to find files. "Delfile" for locating and erasing unwanted files, "Lock" and "Unlock" for file security. And more. You could spend hundreds on other utilities

and still not get all the functionality packed into Disk Optimizer at no extra charge. Use it once and you'll discover what

nearly 200,000 users already know -\$69.95 is a small price to pay for the speed, convenience and safety you get only with Disk Optimizer.

Look for the new Disk Optimizer at software dealers everywhere. Or order directly from SoftLogic Solutions by calling us toll-free.

Just a few of Disk Optimizer's rave reviews: Selected PC Magazine's "Best Of The Best" utilities.

I find Disk Optimizer excellent. Disk access, even at 4.77MHz, is much faster. And louding 100 Fontasy fonts now takes seconds. Elizabeth Joan Doyle, Indama

"I feel this is essential software for anyone with a hard drive."

-D. Sorenson, Texaco, California

"Easy to install, use, and most importantly, it works!" - Dan Nedsen, General Electric Information Systems, NY

SoftLogic Solutions, Inc.

One Perimeter Road Manchester, NH03103 800,277,9900 (603,627,9900 in NH)

Software Publishing Corp.

ways 3.2

Funk Software Inc.

PIPELINE

Top Ten Sellers

Lotus 1-2-3 2.01 Lotus Development Corp. J.K. Lasser's Your Income Tax 1988 non & Schuster Software TurboTax Personal 1040-1987 ChipSoft Inc. WordPerfect 4.2 WordPerfect Corp. PFS:First Choice 2.0

ne of the more-interesting stories about this issue's list involves something not on It. dBASE III Plus has been a top seller since it was released. But in January and early February, sales were slipping. The probable peason: rumors about an update

grew to a dull roar in

Copy II PC 4.01 Central Point Software

the weeks before dBASE IV was

finally announced. Ashton-Tate, which seemed to be hibernating these last few years, began to stir in the dead of winter and is giving every indication that it's just getting warmed up. The surprise deal with Microsoft and Sybase for the SOL server announced in January looks like a stroke of luck for A-T: Sybase provides the technology, Microsoft makes it work on a PC, and Ashton-Tate makes the sale to

end users. Then came the unveiling of dBASE IV, indicating that if they were sleeping in Torrance.

IN PERSPECTIVE

The Top Ten Sellers list ranks PC business programs according to their sales performance based on unit sales. It also tracks programs' rankings over time, in this issue (reading left to right) from January 4 through February 5. A 5-week history is charted to give a sense of a program's sales strength over time. Dramatic shifts in a particular program's ranking may be the result of sales promotions conducted by individual retailers. Or seasonal factors, such as end-of-year-budget purchase decisions may play a large role in the performance of a particular program in any period. More than 12,000 individual locations contribute to the list. Sales information compiled by Ingram Software Inc.

PFS:First Publisher Software Publishing Corp. icrosoft Windows 2.03 Microsoft Corp.

> Turbo Pascal 4.0 Borland International Inc. Rankings are based on net sales by unit; returns are sub-tracted from gross

SURVEY

What with IBM's Presentation Manager being touted as the road to the future, we asked readers how they'd like to see a pro-

Of the more than 500 respondents who are familiar with SAA (Sysems Application Architecture), readers thought it was a positive direction by a two-to-one margin.

Interestingly, respondents only mildly preferred menu designs for themselves, showing a can-do spirit with a healthy "no preference" choice, but respondents almost unanimously recommend menu-driven interfaces for new users.

Which type of interface do you prefer?



they had big dreams. dBASE IV responds to virtually every user complaint that you can think of; there's a compiler, an applications generator, a decent menudriven interface, and real reportwriting capability. The next year's going to be a very tough time for the dBASE add-on busi-

But is Ashton-Tate going in too many directions to pull it off? An OS/2 server, a new graphics product (Draw Applause is being prepped to take on Lotus's Freelance Plus), a major overhaul of dBASE, and a large infusion of cash into Mac software have got to be putting strains on the organization. Not content to port dBASE alone, A-T is planning a full Mac line. And now comes word that CEO Ed Esber has won a scat on Activision's board of directors (A-T doesn't just make TV plug-in games; it also markets PC games under the Infocom, Gamestar, and Electric Dreams labels). Will there be a dBASE game, too?

Don't laugh. Borland International is packing a shoot-'em-up game module into Side-

Kick Plus Borland's subtle aim is to

WAITING IN THE WINGS

Many major applications move into and out of the Top Ten Sellers list when they first start to ship and then they drop down after the first orders are filled. Both WordStar 2000 Plus Personal and Borland International's Ouattro went through this cycle recently. They may be back if word of mouth is good enough

There are some classic programs that maintain enormous followings but they never make it up to the higher echelons of sales. In early February, sales were especially good for Disk Optimizer (number 17) and The Mace Utilities (number 19).

up. Much effort went into building an API (application program interface) for SideKick Plus, and Borland will soon be pushing an API Toolkit to get people writing to it. It's a good idea, but we hope Borland can wait long enough. Look how long it took people to write for Microsoft Windows. Lotus had the same notion with Metro, but it's going nowhere fast.

PostScript Notes

Tektronix, long a power in sophisticated test instruments and high-end graphics tools, is aggressively pushing down the price ladder into the PC business. In addition to the dazzling 4693D thermal printer-now

thinly supported by software vendors)-Tek's about to announce an inexpensive laserprinter controller, which will support the company's own printer-control language, plus PostScript and HPGL

Everybody's talking about doing their own Post-Script, but nobody's delivering. We hope they don't wait too long. Adobe's getting ready to put more speed into the original. The two things PostScript needs to reach its vast potential: more speed and lower prices. Early reports say that color PostScript output is a knockout, but color printing technology lags too far behind to make this a commercial product anytime soon.

Remember all the con-

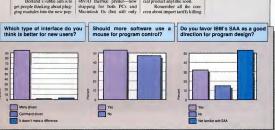
laptup development? Toshiba is now making all of its laptops in Irvine, California, except for the T1000, which isn't affected and is still made in Japan. As we reported previously. NEC also bit the bullet and now assembles laptops on these shores

PC's Limited finally solved the compatibility problems in its ROM BIOS by licensing the venerable Phoenix BIOS. Since OS/2 support will present enough problems, building in all manner of BIOS patches is one headache they're wisely avoiding. And to make OS/2 work in older PC's Limited 286 and 386 PCs, the company will provide new BIOS chips with OS/2.

Good OS/2 News

Microsoft finally announced something for OS/2-the next version of Microsoft Word. It won't ship until late this year and won't have any OS/2-specific features, but its announcement comes with one very cheerful bit of news on pricing: the DOS and OS/2 versions will ship together in the same package for one price.

-Gus Venditto



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OPTASM Blazes Past MASM's Compiling Performance; Lacks for Very Little

HANDS ON

BY BARRY SIMON According to the ads from one major maker of compilers, the three most important things in evaluating any compiler are speed, speed, and speed. From this viewpoint alone, OPT-ASM, a new macro assembler from SLR Systems, presents a formidable challenge to the standard, Microsoft's MASM. But OPTASM also provides

many structural advantages. In our tests, assembly times with OPTASM were consistently 3.5 to 4 times faster than similar times for MASM 5.0 (and 5 to 6 times faster than MASM 4.0). Moreover, OPTASM has more memory for symbol tables and other objects.

OPTASM is mostly MASM compatible. In a large program that MASM successfully compiled, OPTASM flagged three kinds of errors. Two of the errors could be suppressed by reconfiguring the program or corrected with minor modifications in the source code. The third was a genuine type mismatch that OPTASM flagged but MASM didn't

With MASM, forward jumps that can be short but aren't explicitly declared as such will generate an extra NOP instruction, and certain references that can't be resolved in two passes cause a "phase error." in which perfectly reasonable code won't assemble. OPTASM will use as many passes as necessary, so that phase errors now become a thing of the past and short jumps are not accompanied by any spurious NOPs

Conditional jump instructions work only if the jump is short (less than 128 bytes), so a longer conditional jump must be coded as a conditional jump to a nearby dummy label followed by a longer unconditional jump. OPTASM makes this transparent to the user. You can code

conditional jumps as if they always made sense as a single opcode, and if the jump isn't short, OPTASM generates the extra program code with the dummy label. Another neat feature involves date and time pseudo ons so that you can arrange to have

the assembly date included as

OPTASM does not have 80386 support, although it does support the 80286 and the 8087 and 80287. It supports all the MASM command-line switches except for the Pswitch (which is needed to check for protectedmode code). It does not gener-

FACT FILE

OPTASM, Version 1.0 SLR Systems 1622 N. Main St. Butler, PA 16001 (800) 833-3061 List Price, \$195

Requires: 128K RAM, two disk drives, DOS 2.0 or later. In Short: Fast and intelligent assembler. Not copy protected. CIRCLE 436 ON READER SERVICE CARD

Performance Tests: OPTASM vs. MASM

The test file consisted of 134K of assembly language code with no macros. The macro file had n structures. 50n labels and 50n NOPs made with macros. The compilations were run on an IBM PC AT configured with an Inboard 386 running at 16 MHz: the files were read from and written to a RAMdisk

Performance Times

	134K file	Macro (n = 10)	Macro (n = 50)
MASM 4.0	13.6	6.7	N/A
MASM 5.0	10.9	3.7	19.4
OPTASM	2.7	1.1	5.3

Microsoft's Codeview debugger but otherwise generates full information for Codeview and other debuggers. Make and Cref are built into the basic OPT-ASM executable, but MASM utilities like Lib. Exenack, and Codeview are not included

ate local symbol information for

If you are a professional assembly language programmer. this is a mandatory purchase.

WordPerfect 5.0 Likely to Dazzle Users with Its Rlitz of New Features

BY MITT JONES

Few product updates have elicited the anticipation already inspired by WordPerfect, Version 5.0. With each successive visit to our New York offices, Word-Perfect Corp. demonstrates vet a few additional crowd-pleasing features. Our final look at a prerclease version revealed a product that promises to wow users and rock competitors with a range of features only dreamt

of before now Most of the significant enhancements work toward desktop publishing needs. For instance, the flashiest new feature allows you to import and embed color images into WordPerfect

documents. A full-screen preview displays the text and graphics together on the screen; a handful of graphic editing features include scaling, cropping, and rotating.

In order to facilitate the use of multiple fonts or type sizes on a line, WordPerfect 5.0 lets you specify margins by actual margin width, instead of by column

WordPerfect 5.0 also adds the ability to store and recall a "style" for a document or a portion of a document. A style might contain margin, tab. header, and font information,

One of the more ambitious new features, dubbed Intelligent Printing by WordPerfect Corp., lets you automatically print documents designed for one printer on any other printer. WordPerfect automatically matches fonts, type sizes, and so on, as close as possible as it prints the document

The list of new features goes on and on. And if you don't see a particular feature you'd like, you can probably write it yourself with WordPerfect's extensive new macro language. The new language supports variables, delay settings, nesting and chaining of macros, and conditional statements. The macro editor and debugger will be built into WordPerfect itself.

Keep an eye on First Looks for a full hands-on look at the finished version in the next few issues. WordPerfect 5.0 will carry a suggested list price of \$495. WordPerfect owners will be able to upgrade to Version 5.0 for \$60.



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PostScript Special Effects Now Made Easy



BY EDWARD MENDELSON You've spent a lot of money and time on a PostScript printer and Ventura Publisher, and now it's time to cut loose with special effects. Corel Systems Corp.'s Corel Newfont and Corel Headline (\$185 each) let you produce extravagant variations on Post-Script fonts without spending months learning how to be a

PostScript programmer. Newfont takes the native fonts in a PostScript printer and adds shadows or outlines, or makes them change proportion and density as quickly and disconcertingly as things do in Alice in Wonderland. It can slant individual letters or, for a dramatic effect make a line of type slope diagonally up or down the

page. You select the effects you want from a simple menu, then meditate a few minutes while

the printer slowly produces a sample. When you're satisfied, Newfont installs the modified fonts in Ventura and optionally creates corresponding screen fonts. Expect slower output than usual with these modified fonts, as well as some jaggedlooking print with anything smaller than about 25 points.

Headline gives you an infinite range of special PostScript effects that can be used in Ventura and PapeMaker. You can turn text into soaring spiral forms, make a line of type seem to cast a shadow, or add any pattern you like. Headline's menus are clear but complex, and

you'll spend hours generating

test printouts. But the results can be spectacular, and you can borrow ideas from the more than 20 sample effects included in the package.



Corel Newford Corel Headline Corel Systems Corp. 1600 Carling Ave. Ottawa, Ontario K1Z 7M4 (613) 728-8200

List Price: \$185 each Regulres: PostScript printer: Newfont requires Ventura Pub-

lisher 1.1 In Short: Newfour modifies native PostScript fonts for fancy headlines; Heudline creates PostScript graphics effects.

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PortScript's Palatino modified by Corel Newford with a "shadow" and a slight slant. Shorely elegand feats have this elight plant added to the existing itelic versions

101 dBASE Tricks: Something for Everybody

HANDS ON

BY GUS VENDITTO

If you work with a dBASE dot prompt the way others work with a DOS prompt and leave your dBASE cocoon only under duress, here's 101 ways to stave off dBASE deprivation during

your waking hours. The two disks in 101 Utilities for dBASE III Plus, from Macropac International, provide routines that do everything from calculate metric conversions to play roulette, and all of them are dBASE programs. They can be customized to fit inside your existing programs or made to better support your work habits as standalone programs. One of the utilities is a program editor. So if you need a metric converter but want to see pounds (the supplied routine converts to everything but pounds), it's a snap to fix the

code if you're a programmer and a highly instructive exercise if you're not.

There are file manipulation routines, text search utilities, graphics programs, mathematical routines, financial utilities-heck, there's even a program that will plot your

biorhythm.

An entire suite of programs help in date and time manipulation, doing conversions between calendar and Julian dates, converting numeric dates in text, displaying a monthly calendar, and maintaining a daily alarm message.

A large share of the routines simplify ordinary dBASE chores, such as creating an index file, modifying a database structure, and changing the case

of text fields. Some routines seem like they're there just to get the number up to 101 (Macropac has built a line around this 101 theme, with utilities for many popular applications). The color-changing utility simplifies one of dBASE's simpler tasks. And I suppose somebody will want to use the routine that makes their printer work as a typewriter from within dBASE (try this just once and you'll remember why you switched to a

word processor and put the typewriter into storage) The games will amuse only the desperately bored: one is a mock horse race, apparently designed for a dreary afternoon.

I tested a handful of the routines with an early prerelease copy of dBASE IV, and some worked, others didn't. Macropac promises there'll be an undate at a nominal charge to make any necessary fixes, although many of these utilities will become superfluous (dBASE IV will have DOS file

functions, menuing capability,

and better printer control)

Whether you buy these utilities as a stock for your own home brew or to perform routine chores, more than a handful are likely to become a part of your daily repertoire.



dBASE III Plus Macropac International 19855 Stevens Creek Blvd. Cupertino, CA 95014 (800) 624-0077 (408) 996-8143 List Price: \$69 95 Requires: 256K RAM, two disk drives, dBASE III Plus, DOS 2.0 or later In Short: dBASE programs for a wide range of chores. Not

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DeskLink Moves Files Between PCs Over Phone Cord for \$139



Traveling Software made its reputation with Lap-Link, which transfers files between computers via a serial link. Now the company has a new product called DeskLink, which lets one computer use the devices of an-

DeskLink is a special device driver that installs in the CON-FIG.SYS files of both computers. Along with the software-which comes on 31/2and 51/4-inch media-vou get a 25-foot cable and adapters to connect the serial ports of the two machines. Communication speed is selectable in increments from 9,600 to 115,200 bits per second, and the software may be configured as COML or COM2

The local computer is called the lead; the remote computer is called the server. The server must be dedicated to serving, so DeskLink includes a communi-



DeskLink's horkey combination pops up a window on the lead computer that asks permission before taking over the printer

cations feature from which you coordinate your takeover with the other operator. Suppose you are at the key-

board of your IBM PS/2 Model 50 and want to update a spreadsheet file that's on your assistant's XT: press the hotkey combination (it's changeable) and a dialog window will appear on both screens. After you've taken over the XT, you may access the devices on the server as though they were your own. To load the spreadsheet from the XT into the Lotus 1-2-3 program running on your Model 50, you tell 1-2-3 to retrieve G:filename. The modified file

will be stored on the XT. Perhaps the biggest problem is remembering the device

names. Fortunately, another hotkey pops up a window on the lead computer showing the server devices and their names.

You can transfer files between machines, either with DOS commands (that is, COPY G:filename C:filename) or by running Lap-Link, which uses the same cable and is also included with DeskLink.

DeskLink is an inexpensive way to share a printer or file between two computers.



Traveling Software Inc. 19310 N. Creek Plowy. Rothell WA 98011 (206) 483-8088 List Price: \$139.95 (includes Landink)

Requires: 128K RAM, one disk drive, RS-232C serial port on each computer, DOS 2.0 or

In Short: DeskLink connects two computers so that one acts as a server to the other. Not

copy protected. CIRCLE 434 ON READER SERVICE CARD

QuickEntry Simplifies dBASE Data Entry



HANDS ON

BY GENE SMILGIEWICZ

If you shudder at the thought of programming dBASE data entry procedures. Fox & Geller's QuickEntry may be a useful addition to your software library. QuickEntry has design, entry, and customization mod-

ules. All procedures are managed via Lotus-like menus and shortcut key combinations QuickEntry operates without dBASE. It creates database and index files based on field infor-

mation embedded in a form The entry runtime module handles the data entry chore.

Rudimentary, boxed forms may be "built" automatically from an existing database file. OuickEntry uses the field definitions from the database structure to determine the size and data type of each field.

The "paint" method offers more discrete control over forms. You can use any of five character sets to type in text or draw lines and boxes. You have control over color. Block procedures let you manipulate components and attributes of forms.

While OuickEntry does not support the memo field data type, it does provide social security, telephone, state, and auto-date types. The design blackboard may be overlaid by a grid to help determine spacing. Alt- and Ctrl-key sequences quickly center and delete text

and fields. Beep, confirm, and

path options may be specified.

Once a form is specified, you | may browse and delete, pack, seek or print records.

QuickEntry is not suited for complex work, though. Screens may capture data for only one file. Fields may not be validated against data in related files. There is no provision for range checking, picture templates, or calculated fields.

And while touting .DBF file compatibility with Clipper, FoxBASE, and dBXL, Ouick-Entry can deal only with dBASE index formats.



FACT

QuickEntry, Version 1.0 Fox & Geller Inc. 604 Market St. Elmwood Park, NJ 07407 (201) 794-8883 List Price: 599 Requires: 320K RAM, one disk drive, DOS 2.0 or later. In Short: Slick but limited standalone program for dBASEcomputable data entry. Not copy

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PagePerfect is so easy to use, we make this guarantee: You'll start creating page-perfect documents in 30 minutes or we'll refund your money! PagePerfect retails for just \$495 and includes a free Desktop Publisher's Graphics editor (a \$195 value).

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Graphics. PagePerfect puts pictures at your fingertips. Desktop Publisher's Graphics is built right in so you can quickly scan, draw, and edit images.

System Requirements: IBM PS-2 or AT (with EGA), 640K, and hard disk.



WHEN GE SWITCHED TO THE #1 PROJECT MANAGER, THEY BROUGHT GOOD THINGS TO LIGHT.



At GE, Time Line lights up more project manager's lives than any other PC-based project management software. Which should come as no surprise since Time Line is #1 for planning and tracking everything from brochures to satellites in 48 of the Fortune 50.

Even though it's about as easy to use as a light switch. Time Line has plenty of power. It tracks an almost unfinited number of tasks, cost categories, dependencies, and resources. It imports from and exports to 1-2-3, dBASE, and more. And, its meru system bears a striking resemblance to the 1-2-3 you already know. With Time Line, you'll use an inexpensive IBM PC, PS2, or compatible to manage projects that otherwise would require a mainframe. It is Editor's Choice of PC Magamer to years and Dautoy.

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NEW ON THE MARKET

by Michael W. Muchmore

IBM Screen Reader Software and Keypad Enable the Blind to Hear Text from PS/2s

IBM Corp. is offering a system that lets blind and visually impaired people use voice synthesizers to hear text entered into programs running on PS/2s.

The \$600 Screen Reader comprises software and a supplemental 18-key keypad that control any one of six third-party voice synthesizers (\$250 to \$4,000).

Documentation is provided in audiocassette, book, and disk form, and a braille version is optional.

The keypad, which plugs into PS/2 printer ports, is used to manage input settings (such as pitch, speed, and the area of the display being monitored). The main keyboard functions normally,

The program includes a profile language totel il what parts of the screen to read and predefined profiles that dovetal the system with your applications. Last Price: Screen Ready, 6500. Requires: 128 K RAM, IBM PS-2, voice synthesizer (CallTeu 5050. DECTAIL DTOL: Esho PC. Proce 2020. Type 'n Talk, or Votrax Personal Speech System), DOS 3.3 er later, IBM Corp., P.O. Box 2150. Allasma, 624 00555: (800).

CIRCLE 445 ON READER SERVICE CARD

1BM-2133.

Priam Extends Its Line Of Hard Disks for ATs, High-End PS/2 Models

External drives for the PS/2 Model 50, and internal large-capacity drives for Models 60 and 80 and for the AT, round off Priam Corp.'s current line of hard disks. The StorageSpace drives are available in 45-, 62-, and 133MB sizes for the PS/2 Model 50. An internal 330MB 60 and 80, and an internal drive for the AT with 337MB, have also been announced. List Price For Model 90: ED45, \$1,750; ED62, \$1,950; ED130, \$3,920. For Models 60 and 80: 10,330, \$4,540, For ATs and compatibles: ID330-AT, \$4,890 (includes ED5) controller; \$4,540 without controller; (for Compaq Deskroto), Prian Corn., 20 W.

Montague Expwy., San Jose, CA

95134; (408) 434-9300.





Priam's new drives line up (left to right): an external drive for IBM PS:2 Model 50, on internal drive for Models 60 and 80, and the 337MB ID330 for ATs

I his separate keypand controls the functions of IBM's \$260 Serven Reader, while the stondard keyboard is left entirely to the application Users get support from IBM's Namonal Support Center for Persons with Disabilities.

SOTA XT Accelerator Board Runs IBM 0S/2

SOTA (State of the Art) Technology, of Sunnyvale, Calif., claims its new MotherCard 5.0 (named when OS/2 was DOS 5.0) is the only accelerator board for 8088-based PCs that turns your system into an AT that runs IBM's OS/2.

The full-length board comes with an 80286 processor in 10or 12-MHz versions, each with IMB of RAM that can be distributed among DOS (up to 704K), a RAMdisk, extended memory, EMS, a disk cache, and a printer spooler.

SOTA uses an Award BIOS

in EPROM and battery-backed

static RAM that is reconfigurable through software. SOTA plans to maintain compatibility with 08/2 by shipping customers BIOS updates; PC Labs steed 08/2, Version 1.0, on a MotherCard 5.0 and found no compatibility problems. List Price: MotherCard 5.0, 10-MHz version with IMB RAM.

compatibility problems. List Pries: WeblerCard 5.0, 10-MHz version with IMB RAM. 5895; 12.5-MHz version with IMB RAM. 5895; 12.5-MHz version with IMB, 5545; 12.5-MHz version, 5595; 224B. DaughterCarb., 5895; 224B. DaughterCarb., 5895 and 5995. Requires: 8088-based PC. SOTA Technology Inc., 657PA. Pastoria Ave., Sunnyvale, CA. 94086; 4284 245-3366. Hydraulic, Telescoping Device Holds 3 Pounds Of Your Printer Output

Fellowes Mfg. Co., of Itsaca, Ill., has produced a copyholder that clamps to the edge of a desk and holds up to 3 pounds of printer output.

The Workstation Adjustable Arm Data Processing Copyholder is the first such device to employ hydraulics to extend it-

self 33 inches in any direction.
The aesthetically designed,
\$95 implement has a secthrough line guide that expands
to accommodate the thickness

of the paper stack. List Price: Workstation Adjustable Arm Data Processing Copyholder, \$95. Fellowes Mig. Co., 1789 Norwood Ave., Itsaca, IL 60143; (312) 893-1600.

CIRCLE 450 ON READER SERVICE CARD



The Workstatton Adjussoble Arm Data Processing Copinholder optimizes viewing postrion of up to 3 pounds or 1 unch of funfold paper. The \$95 unit uses bydrawing to give you 33 inches of extension

NEW ON THE MARKET

Dell System 200 Has VGA, 12.5-Megahertz CPU, and Lower Price

Dell Computer Corp. is presenting a new line of inexpensive equipment centering on a 286-based, VGA-compatible computer running at 12.5 MHz (switchable to 6.25 MHz). The line also includes printers, a mouse, and software, says Dell.

The base system of the PC's Limited System 200, including a monochrome display and adapter and a 20MB hard disk, sells for \$1,799, and the top-ofthe-line color VGA system with a 150MB

disk goes for \$4,699. You get 640K RAM expandable to 4.6MB on the motherboard; a choice of a 5¼-inch 1.2MB or a 3½-inch 1.4MB disk drive:

The flagship of Dell's new line of PC products, the PC's Limited System 200 claims 12.5-MH: speed. a hard-and-floppy-disk controller; a 101-key keyboard; one parallel and two serial ports; six expansion slots; a 200-watt power supply; and a real-time clock.

List Price: PC's Limited System 200, \$1,799 (with 20MB hard disk and monochrome display) up to \$4,699 EGA, VGA, monochrome, color versions, and hard disks with up to 150MB available. Dell

Computer Corp., 9505 Arboretum Blvd., Austin, TX 78759-7229; (800) 426-5150 (512) 338-4400

CIRCLE 451 ON READER SERVICE CARD



Compaq Computer Comes Out With Its Version of Microsoft OS/2

Matching IBM, Compaq Computer Corp. unveiled its implementation of the Microsoft OS/2 operating system for 286- and 386-based PCs.

Like IBM's OS/2, the Compaq OS/2 extends the 640K RAM now available for applications to 16MB. It also allows for multitasking and exchange of information between applications and has a DOS mode. The Compaq version adds support specifically for its own hardware but is fully compatible with programs written for IBM OS/2, the company claims.

Buyers of this version will get an upgrade to OS/2, Standard Version 1.1, for a nominal sum when it becomes available. That version will incorporate the Presentation Manager graphical user interface.

Other manufacturers of PCs, including AST and Dell Computer, are expected to ship their own OS/2 in coming weeks. LEst Price: Compag's Microsoft OS/2, Standard Version 1.0, \$325. Requires 80/286 or 80/386-based Computer. Not copy protected. Compag of Compag-compasible computer. Not copy protected. Compag Compasible Topy 20/367. PM 149, Houston, TX 70/70; (713) 3/20.6670

CIRCLE 447 ON READER SERVICE CARD

Windows-based Pageview Adds Desktop Publishing Features to Microsoft Word

Microsoft Corp.'s Pogeview is a Microsoft Windows-based supplement to Microsoft Word, which allows Word-mongers to integrate graphics into their word processing documents and to preview them in final form before printing.

The program is suitable for simple business desktop publishing, adding to Microsoft Word the ability to incorporate graphs and logos from spread-sheet, drawing, and charting programs. These images can then be positioned and resized in Pogeview.

Pageview offers full WYSIWYG viewing in pageby-page display rather than in a continuous scroll. It displays headers, footers, correct fonts, and formatting and lets you change them before printing. You can zoom in for greater de-

Pageview includes a runtime version of Windows and uses the same pull-down menu and dialog box interface found in that environment. Use of a mouse is optional.

List Price: Mirrasof Pageview, \$49.95. Requires: 512K RAM, 1wo disk drives, DOS 3.0 or later. Not copy protected. Microsoft Corp., 16011 NE 36th Way, Box 97017, Redmond, WA 98073-9717; (800) 426-9400, (206) 882-

CIRCLE 444 DN READER SERVICE CARD

Micrografx's Designer Gives New Competition To Macintosh Graphics

Micrografx, which staked out the market for Microsoft Windows graphics applications early on with Into Vision and Windows Graph, has gone a step further with its new graphics package, Designer Designer brings designing power to the Windows environment that rivals that of a Mae II equipped with Adobe S. Blustrator.

Designer lets you draw with plenty of primitives, connect disjointed lines and curves automatically, import and edit scanned bit map images, and fill all this with up to 3.6 million mixable colors.

You can create image libraries by defining a section of your drawing; change or create pattern fills; reshape or zoom in on images, rotate them in 1/10 degree increments, and smooth heir rough edges in pages that can have up to 64 different layers. Text can be entered in vector, bit map, and device fonts, niszes of from 1 to 144 points.

in sizes of from 1 to 144 points.

Screen redrawing can be interrupted during any operation,

so you can proceed to the next command without waiting.

The 5695 package includes a run-time version of Microsoft Windows 2.0, a general library of clip art with 300 images, and two coupons: one for a specialized ClipArt package from libraries totalling 3,000 images, and one for Convert, a utility that translates between Auto-CAD and Designer files.

Files created in Designer are compatible with Aldus's Parge-Maker and Micrografis's Windows Graph, Wildows Drow, and In*a*Vision. Designer also supports any input and output devices that can be used with Windows. The program has a PostScript driver that allows up to 2.540-dot-per-inch resolution.

LIST Price: Designer, 5695.
Requires: 512K RAM, two disk drives, graphics display, DOS 3.0 or later. AT compatible with hard disk drive, mouse, and EGA or VGA highly recommended. Not copy protected. Micrografs Inc., 1820 N., Greenville Ave., Rishardson, TX 75081; (214) 234-

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InfoWorld Magazine, 10/12/87, Pg. 59. Surprised? Unfortunately, some people are. Because even though Q&A Write was rated the best executive (easy-to-use, yet powerful) word processor by both InfoWorld and Code Magazine, PFS: Professional Write continues to sell. So we've cooked up an upgrade and promotion to get the word out. And hopefully when it's finished, thoughts of PFS: Write will be too.

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Clipper dBASE Compiling: Finally in the Big Leagues



Clipper, the original dBASE language compiler, has come of are with its latest release from Nantucket Corp. Long noted for its programmer-oriented language extensions and the superior performance of applications compiled with it, Clipper now produces even-faster-running programs while offering a smorgasbord of new features.

Nantucket has carved out a niche in the dBASE language market by providing a product geared to programmers frustrated by Ashton-Tate's fixed syntax and artificial program constraints. Clipper introduced the concept of UDFs (user-defined functions), blew the lid off memory variable and procedure file restrictions, and added useful language elements such as FOR . . . NEXT loops and ar-

Clipper's ability to call C and assembly language programs, subsequently mimicked by Ashton-Tate, inspired develoners to create add-on products. These have grown in range and number to provide additional network support, communications, graphics, and more.

With this version, called Summer '87 but not shipped until winter '88, Nantucket has finally provided a "big-league" compiler that addresses the four major criticisms of previous releases. Clipper now provides support for a dBASE-compatible index file structure, a vastly improved interactive debugger, low-level access to non-dBASE files, and a "real" manual instead of an addendum to Ashton-Tate's documentation. If you have never created

dBASE applications with Clipper, suffice it to say that the process is similar to the edit/compile/link/test cycle common to other compiler languages. When writing programs, you must bear in mind Clipper's divergences from dBASE. It does not support interactive commands such as Browse and Edit. Many other dBASE commands and functions, such as NetErr() and Append Blank, are implemented differently, if not more

tax has been enhanced with the addition of an Elself clause, and it is now possible to EXIT from FOR . . . NEXT loops, Clipper also supports a new construct, BEGIN SEQUENCE . . END, which is useful for excep-



The "watch" window at the upper right provides a "keyhole" view into your program.

tion-handling routines.

The debugger can now be in-

voked from within a program

and is much more useful when a

runtime error occurs. Source

code for Clipper's error handler

is now provided and can be

modified to allow recovery

the compilation procedure for

complex systems. Nantucket

has also improved the interac-

A Make program simplifies

from hitherto fatal conditions.

effectively

"Straight" dBASE programs often need rewrites before they can be used with Clipper. However, the dramatic improvement in performance and robustness of application programs makes any such effort worth doing.

Completely rewritten using Version 5.0 of Microsoft C, Clipper now uses DOS I/O services more efficiently to speed up compilation and program execution. A few new anomalies have replaced those of the previous version, however. Nantucket has indicated that it will issue a free maintenance undate to correct them

Some of my favorite new commands and functions are softseek mode (which allows for relative seeking), achoice() (an array-based function for scrolling light-bar menus), errorlevel() (to set or return the DOS error level), the "additive" clause to the Set Relation statement, and the eight DOS

tive utility programs for file creation and manipulation. There isn't much about the file access functions. new release to criticize other Conditional statement synthan the time lag between its announcement and delivery. The manual shipped with upgrades was not complete, and too much important documentation was in the form of .DOC files on disk.

Clipper still does not provide true windowing and multidimensional array capabilities. When recompiling programs written for the older version. you may run into conflicts with Clipper's new list of reserved words. You will hang, and possibly lose data, if you attempt to go to DOS within the debugger with files open.

If you use third-party add-on libraries, you will have to wait for their developers to convert them before they can be used with this version. A spokesperson for Communication Horizons, a developer of several such libraries, does not expect this to be a big problem.

Clipper's price is steep com-

pared with competing products, but the improvements of this version, combined with Nantucket's allowance for royaltyfree distribution of Clipperbased applications, make it a good value. Though SQL aficionados will have to wait for dBASE IV, any other dBASE language programmers who want to create applications in the manner of their Pascal and assembly language brethren can do so now with Clipper.



ronment and data. I particularly liked its new pull-down menus Clipper, Summer '87 and ability to display active file structures, filters, relations, and Nantucket Corp

12555 W. Jefferson Blvd. Los Angeles, CA 90066 (213) 390-7923 List Price: \$695; upgrade,

Requires: 256K RAM, hard disk drive, DOS 2.0 or later (single-user), 3.1 or later (net-

In Short: Well-implemented dBASE language compiler. Comprehensive set of features and open architecture provide wider programming vistas than standard dBASE. Not copy pro-

CIRCLE 439 ON READER SERVICE CAR



Quattro lets 1-2-3 users do more without having to learn more

If you know how to use 1-2-3*, switching to Quattro* is a snap. There's no back-to-school. It's not that 1-2-3 and Quattro are the same; they're not. But you can tell Quattro to behave in familiar ways, and the sense of familiarity you'll enjoy is more like the one you feel while driving home, but in a brand new sports car.



Quattro goes faster and does things better

1-2-3 moves along pretty well. but Quatro files right by be-cause it does things differently and it does them sooner rather than later. Quatro's recales for example, are intelligent, white means it only recounts the numbers that count and doesn't slowly and unnecessarily recount the whole spreadsheet. And SQZ!* Plus for Quatro automatically compacts and expands your spreadsheets by up to 95%.

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Webster's Thesaurus Pops Up 4 Million Synonyms, No Antonyms



HANDS ON BY DONALD TRIVETTE

Simon & Schuster Software has a stable of RAM-resident products to help the serious wordsmith grapple with precision and accuracy: there's the awardwinning Webster's New World On-Line Thesourus, the flexible Webster's New World Spelling Checker, and the Combo, which combines both into one program. To this trio. Simon & Schuster adds Webster's Professional Thesourus. It's designed for those who need the widest choice of words.

The Professional Thesourus is much larger than its baby brother. It incorporates 50 percent more root words and 4 million replacement words and phrases in its 1.2-million-byte file. In comparison, the New World On-Line Thesourus has just 20,000 root words and half a million replacement candidates. The difference is noticeable. Checking editor in the smaller thesaurus displays three synonyms: redoctor, revisor, and copyreoder; the Professionof Thesourus gives 17 choices.



Webster's Professional Thesaurus, with a 4-million-word dictionary, includes a novepage option so that you can save synonyms from several different words.

including manager, proofread- | er, editoriol writer, bluepenciler, and old mon.

sports, and feoture.

To encourage greater precision, the Professional Thesaurus often gives additional information. In the case of editor, it lists 18 types of editors, including monoging, ossociote, night,

However, Professional Thesourus has done nothing to answer the criticism that all thesauri lack antonyms. If you're

looking for the opposite of opposite, you won't find it here. A spokesman for Simon & Schuster says programmers had difficulty extracting antonyms from the source tapes, but the company plans to include them in a future product or release.

The setup, operation, and format of the Professional Thesourus is identical to that of the New World On-Line Thesourus. It is RAM resident with user-defined hotkeys; setup profiles are

included for 47 word processors, and a custom setup menu is available for those not included. The software adjusts the replacement word for capitalization, plurality, and preceding article, Unfortunately, Simon & Schuster put a check in the program so you can't access the Professional Thesaurus word file from the New World On-Line Thesaurus or Combo software. If you like Combo, as I do, with its spelling checker, word counter, and thesaurus all rolled into one, it'll take more than a few million extra words



Thesaurus

Simon & Schuster Software One Gulf + Western Plaza New York, NY 10023 (800) 624-0023 (800) 624-0024 (in N.J.) List Price: \$129.95

Requires: 256K RAM, hard disk drive with 65K free RAM, DOS 2.0 or later.

In Short: A giant, RAM-resident thesaurus. Easy to install. easy to use, but tacks antonyms Not copy protected. CIRCLE AMAION READER REPVICE CARD

PopBASIC: Shortcut to RAM-Resident Code

HANDS ON

BY GENE SMILGIEWICZ If every BASIC programmer lined up to march off a cliff, the pace of new BASIC language offerings might slack off. I don't know how long it would take to run out of programmers, but I'm sure many would be interested in Hedge Systems' PopBASIC before going over the edge

PopBASIC is an implementation of BASIC that creates memory-resident programs, with a twist: the interpreter itself is memory resident. Debugged

and linked to create standalone executables

PopBASIC lets you export characters to foreground programs or the DOS command line. The foreground screen can

be polled to determine the cursor's position or to change it. The hotkey can be queried, redefined, or disabled. Any foreground keystroke can be "trapped," and the background

program can be activated by a PopBASIC has no data typing! Automatic data conversion handles mixed expressions. (The statement 'PRINT "2" +

timer

The size of the program code space and data space can be explicitly set, up to 49,000 bytes Debugging programs is a

real chore with PopBASIC though. It reports syntax and other obvious errors well enough but occasionally leaves you high and dry (and hung). [3]



FACT FILE

PopBASIC, Version 2.01 Hedge Systems 511 W Glennaks Blud #230 Glendale, CA 91202

(818) 243-2235 List Price: \$79.95 for int er, \$100 extra for compiler. Requires: 192K RAM; IBM PC, XT, AT, or true compati-Ne: DOS 2 Dor later In Short: Produces TSR programs. Not copy protected.

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PC UPDATE

edited by Peggy Gavan

dBASE IV

Ashton-Tate will ship an overhauled version of dBASE by July 31. An applications generator, a compiler, SQL support, Query by Example options, and automatic indexing will be included. dBASE IV will retail for \$795; upgrades will cost \$175; if bought before February 17, \$301 bought after. Ashton-Tate, Torrance, Calif.; (2) 3.793,8078.

10NET, Version 3.3

10NET. Version 3.3, adds a disk-caching utiliyan dhe ReINSTAT utility, a network-monitoring program that allows monitoring of network or station resources from any PC on the network. 10NET is available in twisted-pair and fiber-optic versions, priced at 5095 and S895, respectively. Upgrades ar 599 per network for either version. 10NET Communications, Dayton, Ohio; (513) 433-2238.

Paradox 386

Paradox 386, the latest version of Borland's database management system, uses 80366 technology, allowing the program to breast the 640K barrier and capitol the 80386 s 32-bit architecture and capitol the 80386 s 32-bit architecture and capitol the 10386 s 32-bit architecture and capitol the 10386 s 32-bit architecture and 10386 s 32-bit architectur

Lotus Manuscript 2.0

Lotus's Manuscript. Release 2.0, offers many new word-processing and document-processing features, including macros, a spelling checker, and integrated downloadable font support. The new release also supports additional graphic file formats, such as MacPaint, PC Painthruth, Publisher's Painthruth, and Auto-





Lotus Manuscript, Version 2.0, adds many new features, including a screen capture capability.

CAD. Manuscript 2.0, priced at \$495, is available to registered users for \$75, or free to anyone who purchased Release 1.0 after December 1, 1987. Lotus Development Corp., Cambridge, Mass.; (617) \$77-8500.

WonUnder EGA Support

The WonUnder expansion boards for Toshiba's T1100, T1200, and T3100 now provide EGA support. EGA cards supported include



Connect Computer's WonUnder expansion board now supports several EGA cards.

ATI Technologies' EGA Wonder board. Connect Computer Co. is offering a free board exchange for owners; users must pay shipping and handling charges. Connect Computer Co., Eden Prairie, Minn.; (612) 944-0181.

Compaq Deskpro 286

Compaq Computer Corp. has cut prices on its line of Deskpro 28A To compatibles. The price of the base model, with one floppy disk drive, in now \$2,699, a reduction of \$300. The 20MB hard disk drive model was reduced by \$400 to \$3,599, and the 40MB version dropped \$500 to \$4,499. Compaq Computer Corp., Houston, Tex. (713) 3790-670.

IN BRIEF

Torus has announced Tapestry/8, an eight-user version of its Tapestry/local area network system. Tapestry/6 is priced at 5795. Torus System. Tapestry/6 is priced at 5795. Torus System Size, Robotocol City, Calif. (43) 594-9336 . . . dBM/M.V. Version 4.0, includes withcast pattern maching, pull-down menus. With the control of the contr

OS/2 CONVERSIONS

RapidFile, Version 1.2

RapidFile, Version 1.2, adds OS/2 support, an 80,000-word spelling checker, and a 470,000-synonym thesaurus. RapidFile is now priced at \$295, a reduction of \$100 from the previous release. Registered users can upgrade for \$35; upgrades are free to users who purchased the program after November 15, 1987. Ashton-Tate, Torrance, Calif.; (213) 329-8000.

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Classified Intelligence

Radio Shaft color computer w/printer & cass. drive, several programs, \$250. xxx--Greenville (S.C.) Piedmont, December 1,

1987 IBM Quiet Rider letter quality printer w/tractor feed. \$650, xxx-xxxx Wally.

-Anchorage Daily News, June 12, 1987 Computer Database. Data-

flex and fox space. Call xxx--Raleigh (N.C.) News and Observer, June 4, 1987

Computer wins war against allergic owner-Apple IIE, 128K, monitor, 2 drives, printer, \$1300/obo xxx-TTTT

-Orange County (Calif.) Register, October

JUKI Model 5510 color printer . . . 18 months old. Parallel by directional. \$400. After 5pm, xxx-xxxx. -South Bend (Ind.) Tribune, October 4, 1987

Radio Shack/Tardy RT-80 color computer I system, 32K, external basic sys-

-Springfield (Mass.) Union-News, November 17, 1987

PC (like new), incl. lesserqual. printer & soft-

ware . . . -Boston Globe, December 5, 1987

Microsoft Word virgin 1.05 for Apple McIntosh, \$80. xxx-xxxx (Mt. Laurel). -Delaware Valley Tradin' Times. December 19.

Compact Portable-Like new, 640K, 20 Meg hard drive, 360 floppy, graphics, serial & parallel port, 3.2 doss. Fix disorganizer and many popular software packages, \$1100, xxx-

-Richmond (Va.) Times-Dispatch, December 12, 1987

Lotus 1-2-3. Relief 2.0. brand new! \$110 xxx-xxxx. -Orange County (Calif.) Register, December 31.1987

IBM AT SYS. Not a clown. 640 ram, 1.2 meg & 360k floppy disk drives . -The WANT ADvertiset. November 10, 1987

50 business forms on DSDD disk. Also 50 lotus tin plates-Ready to use, xxx-

-Jacksonville (Fla.) Times-Union, February 15, 1987

Amazing Facts I *** LSI stands for large special

integrated circuits." -Footnote Amstrad PC1640 ad

Amazing Facts II

"If the computer's internal battery dies," Papakyriakou explains, "the computer will still operate, but it has to be 'rebooted' each time the power is turned on, 'Booting' is the process of setting up the software program that runs the computer, which takes about 15 minutes on an IBM computer

"Very few people know about these batteries or what they do." Papakyriakou says -The Los Angeles Business Journal, December 21,

"In 1985, MicroPro lost \$1.4 million. The company was floundering because its oncesuccessful CPM operating system for personal computers had been sunk by IBM's vastly expanded MS-DOS operating sys-

-Investor's Daily, December 9, 1987



Heard or seen anything offbeat, unusual, or just plain dumb about the computer ind. try? Send your offerings to Communiqués, PC Magazine, One Park Avenue, New York, NY 10016, or MCI Mail 157-9301. Please print your name legible: include the name. city, and publication date of any newspaper elipping; and include your T-shirt size. Contributors receive \$50 and a PC Magazine T-shirt.

Winners this issue: Michel Potheau (Swiss Army knives). Rick Thornton (LSI circuits), Alan Heinal (computer batteries), Toby Scott (MicroPro CPM), David Trachtenberg (Dac-Easy), Elizabeth Molony (allergic owner), Michael Ruffner (by directional tractor). Michael Rase (not a clown). David Mason flotus tin plates). Stree Kropla (Quiet Rider), Laurence Marks (fox space), Tom Prendergast (Tardy RT-80), Dale Ankers (Radia Shaft), Mark Hutchinson (lesser-quality), Sandy Mayer (virgin 1.05), David Rauma (fix disorganizer), Alice Tang (Relief 2.0).



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THREE LITTLE QUESTIONS



Our readers are nothing if not persistent. They keep asking the same three questions again and again. Finally, they're beginning to see some answers. But what are the questions?

Those three magic questions.
We've tried deflecting them, ignoring them, and even answering
them, and still they don't go away. It's a
verbal version of Ring Around the Collar.
And our readers do, in a sense, have us
collared.

collated: even given prizes to the sales. For while, at mer group meetings we would give a PC Magazint T-shirt to the sales of each of the magic questions. (Then there was the guy who threw his hirt up onto the stage, hopping that I'd throw a PC Mag shirt back. No luck.) The body and the sales of the sa

- ery page?

 Why is there so much cardboard in the
- magazine?

 Why don't we publish an index?

MORE PAGE NUMBERS The first one is easy. Most of the adversing in PC Magazine is full page, 4-color adversing in PC Magazine is full page, 4-color adversing. The ads often come to us in the form of the bleed ads, the ones in which the printing extends to the edge of the page. In such a case, we can't add page numbers without page to the page in the page of the page in the page number. Decause we can't say of sure how the page numbers will fall when the magazine finally comes together. Also, there's

the same place from issue to issue.

What we are doing, however, is finding ways to put page numbers on partial pages, the ones that have both articles and advertising on them. Both then become easier to find. And, we plan to move all the page numbers to the outside edge of the page, instead of the current center location.

LESS CARDBOARD The second question, regarding those thick insert pages, is largely a dated perception. We have far seles cardboard in the magazine this year, by the simple expedient of charging more for it. The cardboard will never go away completely. For one thing, some advertises will always pay a premium for introducing a break, or place where the magaginary pays a premium for introducing a break, or place where the magaginary pays and the pay

Also, the blow-in cards for PC Magazine and other Ziff-Davis publications



won't go away. In fact, they're the primary means by which we get new subscribers to PC Magazine. If you already have a subscription, give one of the cards to that pesky guy who keeps asking to borrow your issues. Otherwise, regard them as free bookmarkers.

INDEXED AT LAST Finally, I'm pleased to say that there is now an effective modes to PC Magazine. And I'm even modes to PC Magazine. And I'm even modes to PC Magazine. And I'm even the fine from the

The product is called PC-NDX. Fitting, by, it's disk-based. Its author, Dick O'Kuchl, sent in a copy for review, without findiar. You can imagine the general surprise and delight around the offices and delight and the observation of the obse

Ruem has one an impressive job or ganizing all of 1986 and 1987's issues. He's indexed over 5,000 keywords in each volume, with the title, page number, and a brief description in each entry. Sometimes the description is close to what we write in





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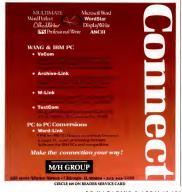
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BILL MACHRONE

the table of contents; often it's his own interpretation. In any case, the descriptions are accurate and to the point. The more technically inclined among you will especially appreciate that he's indexed the technical columns. Now it's a snap to find out where you saw that neat little routine for using the line-drawing set from within 1-2-3, or to refer back to the author's description of one of your favorite utility programs. My favorite part, however, is that

· I've long held that an index to PC Magazine was an ideal aftermarket product.

he's even indexed the letters, so you can follow discussions that may have been triggered by an article or even note corrections and amplifications in later issues. The only aspect that I found annoying is that the descriptions are all in uppercase, although all product names are spelled exactly as the manufacturer lists them.

O'Kuehl says that the next version, to be delivered with the first quarterly index of 1988, will be able to search multiple years. This is a handy feature, but not critical, given the quick retrieval speed.

O'Kuchl built PC-NDX with Clipper, the popular dBASE compiler. Searching is simple; you enter one or two keywords on an entry screen. There's an implied AND operator between the two keywords. On a hard disk, the searches are quick. You get a menu screen of the articles that match the criteria. You move a cursor bar to each article and press the Enter key to see the citation screen. You can order your own copy of PC-NDX at (219) 256-1045. I've saved the best for last: the price.

PC-NDX for 1986 is only \$8.00; 1987 is \$9.00; 1988 is \$19.00, which includes quarterly updates. I like the pricing scheme-the future is more valuable than the past.

Now just think how much more useful that index would be if there were numbers on every page.

Roger Staubach and Terry Bradshaw on Dac-Easy Light.



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Roger: Of course I'd never argue with you, Terry, about Dac-Easy Light because I know it's perfect for office accounting. Dac-Easy Light let's me concentrate on doing business,

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just minutes! Terry: Roger, when did we ever disagree about

anything? You know Dac-Easy Light is perfect for home accounting. Light makes home finances fast, fun and easy. The preset home chart of accounts has everything I need. I can write checks and do bank reconciliations by computer without knowing the first thing about accounting.

Roger: Light makes it a snap to track sales and budget expenses for up to 12 months on-line. With Light, I know my business' current financial status in minutes

Terry: It's the same with home accounting finances, Roger. I can get my personal net worth in seconds since Light instantly reflects the effect of changes, payments, withdrawals and deposits.

Roger: Light gives me the option of handling accounting on a cash or accrual basis. Plus, if I forget any account or customer. I can quickly call it up in

Terry: Well don't forget this, Roger, With Dac-Easy Light I can quickly set up new credit card accounts, post receipts, and keep tabs on current card balances. Plus, I don't have to know debits or credits because the system knows and automatically does them for me.

Roger: Terry, for once I think you're right. Light's so smooth and easy to handle, even you can use it.

Terry: And you're right, too, Rog. Using Light, you'll have more time to spend on the golf course. I just hope you're not trying to compete with my hall of fame game!



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CROSSROADS AHEAD-LOOK OUT FOR TURNCOATS



When Apple introduced the Mac II, John Sculley said there was a window of vulnerability in the PC camp. It's still open, and the view it presents is attracting many former PC users.

P^C users are going to be in big trouble if OS/2 isn't a big success. If OS/2 isn't a success, then we will lose at least one and maybe two iterations of the software development cycle.

Programmers develop products for systems on which they feel they can make money. If OSZ isn't a rousing success, then developers will go elsewhere to make their coinage and, perhaps, stay away from the IBM PC arena long enough to doorn it to a slow, miserable death not unlike that of CP/M, its progenitor.

The possibility fooms like a black cloud over us all. While DESQview 386 and other hodge podge solutions work well mough, they are not the future. We just can't continue to live in a nerve-racking world of idiosporariate parches, fixes, and incompatibilities. This means OS/2 must work, unless Quatertack or someone else offers an alternative and complete operating system.

None of these worries is helped by the fact that OS/2 is a memory hog, requiring megabytes and megabytes of memory to work well. Compound this with the drop in the dollar and the increase in the value of the yen, creating a radical rise in memory prices. An unfortunate coincidence, perhaps. I think of it as a bad omen.

Another problem is end-user confusion caused by Microsoft and its sudden promotion of the graphical interface. Too many PC users are not moving from the PC and PCXT environment to the AT and 386 environment. Instead they are choosing to move to the foreign Macintosh environment, saying, "Well, if graphical is in.

then let's go with the leader." They make the change to the Mac, no matter who painful. This is especially true if they are given the opportunity to compare the endicore graphical interface offered by Microsoft with the fancy Macintosh system. IBM and the cloners are at the mercy of intersoft which is concept of a graphical interface, which is a clunky, Stone-Ag concept at best. If the developers see these trends. Result: old-time IBM hacks are now "toying" with the Mac.

BILL'S NO MOUSERTEER Worse, Bill Gates himself, according to a statement he made to the New York PC User Group, seldom uses a mouse. Gates is Microsoft. His disregard for the mouse is reflected in the mouse interface. The mouse and its interface are integral to the graphial environment. The IBM PC does not have a good mouse interface. It's a combination of hardware and software problems,



but the system is not designed to be used with a mouse. Those who use a Macintosh and an IBM know there is no comparison between the two when it comes to the mouse. Amateurs will choose a Mac 100 percent of the time if given a choice. This single interface—the mouse—is a primary

reason for the selection.

Worse than the fact that a mateurs choose the Mac, old-time PC users change to the Mae most change to the PC—by far. Recently the Boston Computer Society Resource Center held a debate between Mae users and IBM PC users. While most of the battle was a standoff, I was impressed by one important observation more people change from the IBM on the Mas than vice versa. Those vertex More when I say "more people" in the previous sentence, I mean 100 to 1. That's the misto.

BRAVE NEWWORLD? Now, if squire possible that many of these fisk were never cut out for the PC environment and that; all there is to it. There are also many more PC users than Mac users, so this may be specious. But the recent promotion of the graphical interface, the need to upgrade, properly contribution over OS/2. bord deterface, and the recent introduction of the proprietary Micro Channel may drive people to the weird world of the Apple Macinton's notice of the proper of

This is not good. This brave new world is foreign, expensive, and without clones. It's the worst thing that could happen.

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INSIDE TRACK

Hot Everex 386, proprietary cache, TRON chips, and going through garbage—the week in review.

Hot machines coming. I've seen some really hot 386 machines in the past couple of weeks. The absolute fastest I've seen is the Everex 386-the one to watch. This speedster was shown at the last Comdex but not really announced. Everex is one of those companies that is making too much money and doesn't want to jinx things with promotion. In fact, the company has a policy of no review copies to the press. Apparently, some years back the company sent an add-in card to a Latvian hack reviewer who could read documentation only if it was written in an obscure dialect of Serbo-Croatian. The review wasn't favorable, and the company decided it was better off not having its products reviewed at all.

The amateurish marketing department of Everex has since been shuffled, as a new director of the firm has decided to make the owners face the fact that they are in the same business as everyone else. Hopefully, samples of their products will be passed around and we can tell you if the stuff is any good. My experience is that it all seems to work and it sure is inexpensive. That's because the owner, Steve Hui, is close friends with the owner of the giant Wong Electronics in Hong Kong. This company is out to lowball everyone. The 386 computer, though, is a new direction for the firm. It's slick and state-of-the-art.

The key to the Everex 386 computer is the 128K hardware cache. Hui (an Amdahl expatriate) and a few of his mainframe buddies took a long, hard look at the Intel cache chip (which everyone else uses) and decided that it just wasn't very well designed. So they did their own de-

This machine clocks out faster than

any 20-MHz 3861've seen thus far, with an effective 32.6-MHz reading on the Landmark test and high numbers on every benchmark test I could find. The company expects to sell the thing for around 54.200. Hot suff.

while testing a slew of 386 screamers, I've also played with nearly every VGA on the marked. It tuns out that they are all slower than one can imagine and are a performance bottleneck, period. Think twice about going to VGA and especially avoid the 8-bit cards. Even the 16-bit Compaq card is a slow performer, but it comes closest to acceptability. Every week someone is telling me about a fast VGA. I'd wait.

Last performance note. By accident I recently discovered that my Multisoft disk cache actually worked better when my CONFIG. SYS did not use a "BUFF-ERS" statement. Apparently the buffers (a form of nonsense cache that's usually necessary on hard disk systems) impair performance when a real cache is present. FYI.

Sent. PTI. The World of the Macintosh Dept.: The World of the Macintosh Dept.: Jan Francisco. A few of the bot prodsets there were the AST 80266 adds in card on the Mat. and a couple of 8086 and the macintosh of the sent of 8086 8020. I was told that the 6020-based Mac II mas as fast as an XT under full emulation. Previously I've seen as exceltent 5020 emulator that runs on the 68000, allowing the Mac to run Apple II software.

It turns out that nobody really buys these emulators in large quantities. If you want to run 8086 code, you buy an IBM PC. I always felt the key to understanding the raison d'être for these products is to bluff your way past purchasing

agents who demand PC compatibility. "Yeah, yeah. This Mac II is PC compatible. I use the emulator."

Maybe there's more potential here. The gays who do emailtours might, like an Oklahoma farmer who's unknowingly sitting right on top of an ol treserve, be in for a bonanza. If there is a trend towards fancy RISC chips, then those software developers who know the ins and outs of emulation will rule the roost when RISC makes need to make their chips work with old software. It's an interesting thought, eff.

Software emulation of RISC chips will surely stave off the latest Japanese attempt to attack the lucrative microprocessor business with a new architecture. Dubbed a TRON microprocessor (TRON stands for: The Real-Time Operating System Nucleus), they are supposedly up to five times as fast as, say, an 80386 chip running at the same clock speed. If you hear about these things, just say, "Forget them. They aren't going to succeed." Thank goodness the Japanese are out to lunch in this arena. Already they're talking about how this chip is perfect for UNIX! Zounds. Shades of the National Semiconductor 32032 and

other world-famous duds. Hard to Believe, but True Dept.: Let me throw this at you to show you how some people make a living. Bill Gates, take notes! A reporter friend of mine tells me that one of his sources has made it a habit over the past few months to hang out in Fremont near the NeXT Computer Corp. (Steve Jobs' new company) and rummage through the dumpster, looking for Steve Jobs' trash bag which is tossed there nightly. The only thing I was told is that Philippe Kahn and Jobs have made some sort of "arrangement," Kahn will be a big supplier of software for the new machine. Now you know what shredders are for. I suppose the guy has collected all sorts of interesting memos. What a life.

Sure your co lots of things, b

If you're like most people in business, a day doesn't go by when you don't have many balls up in the air at once.

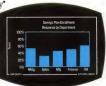
But your PC is probably not equipped to help you with all the different aspects of your job.

the computer for more than one task, it's often annoying and time consuming jumping back and forth from one program to another.

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A SPREADSHEET TAXONOMY, PART 1



The latest wave of questions from this consultant's clients focus on the flock of new spreadsheet programs that have descended on the market since Thanksgiving.

The work of a consultant has its ebbs and flows, its predictable waves and cycles. Yet I'm always surprised by how often calls for help come in groups of remarkably similar requests.

remarkany similar requests.
There were the great waves of calls to run evaluations to pick company-standard word processing programs, followed by a period when it seemed half my time was spent trying to assess the productivity increases wrough by the filts couple of years.
There was the period of constant LAN-planning sessions, looking at the how and when—if often too little at the why—of bringing in networks.

Last year I lived on the road for 2 months, helping corporate clients figure out what, if anything, the introduction of the PS/2 meant for them. Followed, of course, by the flood of calls to come talk about what OS/2 meant, and about ways of extending both the life and the functionality of DOS.

This winter, my work has to a large extent focused on helping clients try to make sense of the flock of new spreadsheet programs released since Thanksgiving: which to consider, if any, for which kinds of PC users—and is it really necessary to deal with all this right now?

Over the course of a lot of sessions with laarse-scale corporate users of spreadsheet software on PCs...from the experience of working with a great variety of power spreadsheet users as they explored each of these new programs and compared them to what they knew...and after long hours at my own PC, moving models built under

one program to another, translating macros, running speed comparisons, booking at how intelligently standard and expanded memory is used, ad infinitum...I've developed some firmly held views on which programs are going to prove best-suited for

certain kinds of users and companies.

I caution that these thoughts aren't the result of sophisticated, quantifiable analysis, but rather the gut-feelings-level conclusions one reaches after watching a lot of people work with the programs, and listening both to what they said and to what was between the lines in what they said.

A client recently called my schema on the new programs "Seymour's Spread-sheet Taxonomy." While I reject the scientific connotations of that phrase, it does convey what I've tried to do. Since clients tell me that they have found these thoughts a useful framework for evaluating the new spread-sheet programs—even when they've disagreed with my conclusions—I



thought I'd pass them along, in this and the next two issues.

Remember that unlike, say, the objective, multiproduct reviews and Editor's Choices you'll find elsewhere in PC Magazine, these conclusions are just one man's opinions: informed opinions, but hardly etemal verifies.

IN THE RUNNENG First, the players. Borland's Quattro, Microsoft's Excel, PCSG's Lucid 3D, and Surpas's Surpass are the Big Four. Of course, other new and newly revamped spreadsheet programs are available as well, but corporate interest has focused overwhelmingly on those Big Four.

Phis, of course, three Loxis products, two of which are still out there in the vapor. 12-33. Release 2.01—now in wide use and overyone's benchmark)—plus 12-34, and overyone's benchmark)—plus 12-35, this year. Ves. it is manifestly unfair to compare products you can go down to the comer computer store and buy for cash with products not yet released. But in a 12-33-dominated world, 12-32 users are very much stacking these new entries up very much stacking these new entries up taus, so lignoring those ethereal new re-leases would be nate.

THE RULES First, an overriding rule: If you're happy with what you've got, don't use anywhere near all of its features, and can't understand what the big deal is about new versions of something perfectly satisfactory in its present form, don't waste time looking at the new entire.

■ JIM SEYMOUR

Changing to any new program is at best a disruptive, time-consuming, and inconvenient process. A worst, it is like getting a mouthful of root canal jobs in one after monou. If you're using 1-23 or Super-Cule or the spreadsheet module in an integrated peakage happily now, don't worry about changing. You'll never feel that the cifron was actually worth the trouble or that you got a reasonable return on your invest-

And a second general rule: The level of "interoperability"—the ability to read other programs' file formats and write new or revised files back into those other formats, all in the interest of easy exchange of worksheets in an office—is generally high. For many, that will effectively end the requirement that everyone who works in the office use the same spreadsheet proeram.

But there is interoperability and then there is interoperability. If you just need to

■ In a 1-2-3-dominated world, 1-2-3 users are very much stacking these new spreadsheet entries up against what they think is going to be coming from Louis.

convert a few existing spreadsheets, you can live with even a manual file-conversion routine.

But what do you do if you need file format conversion—especially on a two-way

basis-on a day-to-day basis?

If you frequently pass worksheets around on disks among the people with whom you work so you can fiddle with each other's assumptions or have assistants handle data entry for you, you want a program that automatically detects other programs' files and converts them without your intervention. And you also need easy saving of the revised spreadsheet both in your new program's native file format and also, separately, in the file format in which you received that file-without necessarily knowing what that format was. None of the new programs that I've mentioned here do that as well as they should; make sure that if you leap, it's to a program that manages translations as painlessly as possible

Next time I'll go through each of the Big Four new spreadsheet packages, with my notes on who's likely to find each the best choice.

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It's a full-fledged computer the size and weight of this magazine. It's got cute programs built in. Too bad it comes from England loaded with English eccentricities.

Anybe it's the diet of rack-cooled toats and overcrooked brussels sprouts. Maybe it's the unending drizzle and warm beer. When it comes to new products, the British always seem to he a pound short and a day late. I must be truly gailing to watch your enstwhile sold to crocodile Dunder while you export to provide the princess' sparty behavior. Exhibit A? Sir Cire Sinchier, a bona better the provided the princess' sparty behavior.

fide knight, honored for brilliant inventions. Which, exactly? An early pocket calculator quickly bested in every world market. A miniature TV before its time and price point. The ZX80 and ZX81 (a.k.a. Times 1000), two cheesy toy computers with horrendous keyboards and wacko BASIC. An electric car that seems to have enabled into the laws of physics.

LITE COMPUTER Now Sinclari is book with another of his marvels of miniaturization—a computer roughly the size and weight of the issue of PC Magazine you have in your hands. The Cambridge 288 boasts a fluthsie keyboard, built-in spreadsheet, word processing, and diary functions; plus coke, calculator, terminal program, and a single 9-pin port for serial and parallel 10. In England it goes for about \$500; at deadline, American distribution was being arranged.

What a great idea: a computer as small and light as a magazine! Could this be Alan Kay's much-vaunted Dynabook, the true go-everywhere notebook computer? No. it could not. It's more like the hightech doorstop of the eighties, the lite computer, a Yuppie toy likely to appear briefly in a Sharper Image catalog (it's the requisite sleek black) before flaming out in a closeout special from DAK.

The keyboard is downright weird: a single piece of molded plastic whose silent, full-size keys have an OK shape, a wee bit of travet, and a rubbery feel—as though a real keyboard were sheathed in a giant surgical glove. There's a diamond where Ctrl should be; there are keys marked INDEX, MENU, HELP; and there's a key with a square on it had so sort of like Alt.

But just sort of. The only thing about the Z88 that's IBM-compatible is a 45-buck cable-and-software package that swaps files at 9,600 bits per second and can convert them to and from Wordstor or Lotus 1-2-3. WK1 format, since raw Z88 files are alien to IBM PC programs. The Z88 thus demotes itself to the "notebook" role bother Tandy Model 100.



The Z88's supertwist LCD screen has a contrast control, but the only way to angle it is to tilt the whole unit with a filming two-position "foldaway foot," You see 9 lines and 60 columns of skinny characters, plus menus and even a tiny "map" that shows a "greeked" representation of the current printed page in 1-pixel "characters," (it folios better than its ounds, You also the mysterious word OZ at the upper right for reasons the manual does not explain.

BIG BUCKS PER BYTE Speed? The microprocessor is a fast CMOS Z80. "Fast" in the Z80 world means it's not hard to outtype the display. By a lot.

Memory? A whopping 32K or so that quickly disappears when you run applications. You can add up to 256K RAM in cartridges—at a stiff 90-odd bucks per 128K.

Disk stonge? Say what? The only stonage available is EPROM cartridges, again at roughly 590 per 128K, undoubtedly the worst byte-pr-buck ratio in recent history. (Think about it: at 70 cents per kilobyte, your 40MB hand disk would cost a mere 528K.) You can erase an EPROM only in its entirety, just like reformatting a floppy disk—but only if you spring 70 bucks or so for the EPROM eraser.

Applications? The main one is something called PipeDream, suggesting that perhaps a dissipated De Quincey heads software development, peering at his tiny screen through an opium haze. Could bethe program is essentially a spreadsheet, but it comes up in word-processing mode and uses special commants for math. Feaand uses special commants for math.

STEPHEN MANES

tures abound, most so odd and quirky that you'll end up needing to carry the 1-pound manual around to use them.

The other major application is BA-SIC-BBC BASIC, used only by British of special symbols. That kind of BASIC.

schoolkids. It's the kind of toy BASIC that requires all keywords to be entered in caps, doesn't include a line editor, and accepts ASCII files only if they begin with a series DAZZIE THE SERFS There are cute ideas here. The calculator includes a bunch of slicl metric-to-firish conversions, useful for dazzling your serfs with your hectare holdings. The Printer Code Editor accepts your printer's codes for various functions, then intermediates between all applications and the printer. A single printer estup for all programs is a sick idea, also, you have to enter the relevant data ob, hand unless you own the cléfattle Evaluations.

The "diamond" control key is oddly interesting, too, since you don't have to hold it down once you've pressed it. Probably just as well; to deltee a work session, the requisite command is to press the diamond and type KILL. To delete a PipeDream row, just press diamond and EDRC. Essy!

Vertical moving-but menus are the usual interface—except when memory gets low, as when I saved one copy of this column and began work on a second. Then the Menu retuses to light up the bar. You still see the diamond-key shortcuts, but you have to remember the one you want long enough to press Esc (which makes the menu disappear) and execute it.

Worse is the minginess of the help. Often, there isn't any; press the Help key and you get the name of the active program atop a blank screen.

So it's hard to imagine this thing will make a splash on this side of the pond. The nolly real application it runs is PipeDream, and even if that's ported to the IBM PC, users aren't likely to flock to it just so they can tuck Z88s under their arms.

A little more money—wery little if you consider the price of 228 and Jones—huys a Tookink T1000 and a single SS disk with more capacity than S450 worth of EPROMs. Plus the Tookinka runs the software you afready own; there's no learning curve. A16 pounds, it's not as portable as the Z88, but it's not likely to poop out with memory pairs. It's also got a real keyboard and a halfway decent screen.

This year or next, or soon, somebody will undoubtedly take up the guantlet and deliver a notebook-weight DOS machine that'll make the 288 look even sorrior. Meanwhile, the British will continue on their doomed path of setting standards accepted nowhere in the world but on that scepterd iske. Anyone for an Acom? An Aniendood? 2007 A mighthood?

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Inspired by the success of desktop publishing software like PageMaker and Ventura Publisher. a new wave of products has washed onto the scene. They brashly boast prices as low as \$80. But do they deliver the quality output you should expect? We show you what you get with Byline. GEM Desktop Publisher, PageBuilder, NewsMaster, Newsroom Pro, and PFS: First Publisher. y now, you've probably heard all the byea bord deskip bepablishing. About how the market is growing at an astounding rate. About how, for instance—by the reckning of DataQuest, a market research firm in San Jose, California—shipments of deskipo publishing software are expectages for both the PC and the Mac in 1986 to more than 600.000 in 1990.

But the real scoop behind the figures and the hyge is the simple fact that, just as all businesses do accounting and wort processing, they all publish. They publish everything from books, newspapers, magazines, and catalogs to price lists, telephone listings, documentation, pamphlets, reports, newsletters, resumes, letters, and materials for formal and informal abusiness

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presentations. And PC-based publishing tools save businesses the time and money once required either to cut and paste documents together by hand or to send the job to professional typesetters.

The broad definition of a desktop publishing program has become any tool for the PC that helps you compose any document faster, smarter, better-without T squares, scissors, or glue. The narrowest definition of desktop publishing is exemplified by products such as Aldus Corp.'s PageMaker, Xerox Corp.'s Ventura Publisher, and Laser Friendly's The Office Publisher (reviewed in "Desktop Publishing Comes of Age," PC Magazine, October 13, 1987). These tools, which range in price from \$695 to \$995, allow you to combine graphics and text into a document on a WYSIWYG display and then edit the document there. Such packages are few in number because they must integrate all text and graphics formats, support a multitude of fonts, and encompass most of the tools in a typographer's shop and graphics artist's studio (and accomplishing all of those objectives is quite a job for program-

mers). Attracted by the success of PageMaker and Ventura, repelled by the difficulty of the programming, packages that meet the broader definition are pouring onto the scene. In most cases, they edge into the market with lower cost-a maximum of \$495, though most cost from \$100 to \$200-and easier use. While most can combine text and graphics on a page, they eschew many of the traditional typographic tools found in the higher-end packages, such as automatic hyphenation and justification, kerning (the way typographers fine-tune the spacing between letters within words), control over leading (the vertical space between lines), and

UPSTARTS

other sophisticated typographic features. Potential buyers are left with a confus-

ing array of choices—from products that provide the highest quality of published output down to those that embellish what comes from a word processor.

Here we attempt to delineate all the choices in PC-based publishing. We review and test packages that are the direct descendants of the standard-setting Poge-Maker and Ventura. The reviewed products comprise the middle and low ends of the desktop publishing market. They all have some sort of WYSIWVG editing or preview modes, and they can all produce our benchmark-else mewsketre.

our beckmank-test stewster?
At the mid-level are Digital Research's
3395 GBM Deskop Publisher, shipped in
June 1987, and Ashton-Tase's \$295 Byline, introduced last fall. White Sciences'
pageBalder, at \$957, falls into this category in terms of capabilities and price, but
you must also use Fall Tree Systems'
Llaser card with a laser printer based onether the Cannot Cor of the Ricch 4808 Eengines, such as the HP LaserLet, to get any
outrout.

Down a level, hovering about the \$100 price level, we found Software Publishing Corp.'s PFS:First Publisher, Unison World's NewsMaster, and Springboard Software's Newsymap Pro

PROFESSIONAL-GRADE DTP To understand the low-end market, you must know the history of desktop publishing's uppermost reaches. Features once considered high-end have reached lower-end products. Features now high-end will someday trickle down.

The first publishing systems for desktop PCs, which have been around for the last 5 to 6 years, were designed to let the PC emulate front-end terminals to expensive typesetting machines. These products made it easier for people to embed typesetting codes-some of which are similar to WordStar dot commands-into documents to format text, insert rules and boxes, and set up multiple columns. These early programs included ScenicWriter. from ScenicSoft; Magnatype, from Magna Computer Systems; and Horizon Series Composition Management Software, from G.O. Graphics. All cost at least \$1,000. Early page-composition systems such

as Superpage from Bestinfo became available 2 to 3 years ago. They allowed the publisher to compose whole pages with multicollument text and graphics. With these packages, you could post text from any word processing program into a collection of the processing processing the p

Some of the early page composition systems could also incorporate scanned graphics. You could then print their documents with laser printers or output them using sophisticated typesetting systems from companies such as Allied Linotype, Computaryabic, and Autologic.

Compugnaphic, and Autologie. These tools significantly reduced costs for type-setting—older type-setting systems ran upwards of \$100,000—but they were far from cheap. (For example, the original version of \$Superpage cost \$7,000 in 1985. Today, \$superpage 11 sells for \$8,500, by today's standards, however, they were painfully difficult to use. One wrong code or command, and the system would often

Today's high-end professional publishing systems include Bestinfo's Document Manager System; Ultimate, from Composition Technologies; and Archetype Designer, from Archetype. They range in price from \$3.500 to \$8,000.

These new systems are designed for networked work groups. In some cases, they provide individual software packages, such as text editing, graphics design, and page layout for different group members, yet allow users to transfer files back and forth over the network.

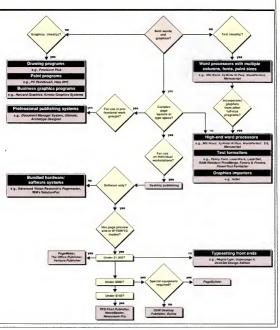
They also let you integrate files from different types of software into a single document. They can import documents from spreadsheets, CADCAM systems, graphics programs, and word processors, automatically sizing them and converting them into typographic format.

These modern professional desktop publishing systems also offer interfaces improved by pull-down menus and the ability to switch between a code-based display and true WYSIWYG for precise control over the placement of elements. (The original Superpage, in contrast, was un-



Desktop publishing is a broad term that the seen used to describe the capabilities of everything from paint programs to word processors. The decision guide here should help you zero in on the best overall form of PC-based publishing for your applications.

isolated, you decide to choose a medium-to-low-and product, the chart bolic can help you select the best one. Key differences among page composition programs include the learning curve, easily with the company of the



able to display on screen exactly what the printed fonts would look like.)

As you would expect, these systems abound in features. They can add rules and boxes, import graphics, perform sophisticated hyphension and justification, kem, and place multiple forts in multiple sizes anywhere on the page. As time goes on, more features from this type of system will fail their way often to single-user PC appearance of the property of the property

FOR THE MASSES Publishing professionals have long been aware of the PC's proper place in the publishing, or attractive presentation, of written materials. But it took the general business public more time to realize that the PC and word processing software were more than simply tools for writing reports more easily.

Microsoft was the first vendor to realize

that word processors could be more than mere content processors. In fact, from the time of its introduction in 1983, Microsoft Word was designed with the printed result in mind. Word 1.0 allowed proportional spacing, style sheets, multiple columns, and automatic hyphenation. Word 1.0 could also mix different fonts in different sizes within a line of text, as well as draw

boxes around paragraphs. It also offered menus and two-key codes for selecting fonts on laser printers and on some typesetting equipment. Most amazing is the fact that the only tools then available for printing all this were dot matrix and daisy wheel printers.

For the rest of PC form, it was the advent.

For the rest of PCdom, it was the advent of reasonably priced laser printers-particularly the 1984 introduction of the \$3,495 Hewlett-Packard LaserJet printer-that gave people the tools needed to present word-processed documents attractively. Although the LaserJet had only one typeface when it was first introduced, laser printers soon became able to use their 300dot-per-inch resolution to produce characters of almost any shape and size. In particular, laser printers offer proportional typefaces, for which different characters consume different amounts of space on a line, just as high-quality typesetters do. And a laser printer can mix type in varying sizes and styles to produce near-typeset-

quality appearance.
Today, the \$2,595 HP LaserJet series II comes with Courier, Courier Bold, and Line Printer fonts in both portrait and land-scape orientations. It also offers two slots that accept font cartridges from HP and other vendors.

However, with the exception of Microsoft Word, it took most word processors a while before they could actually use the capabilities of laser printers. In the meantime, a number of third-party vendors maked in to fill the gap, resulting in such products as SoftCraft's Fancy Fant, Bear Soft Soft Fall the Soft Fall to Fancy Fant Bear Technologies International, Polaris Koftware; LaserSet, from Laser Technologies International, Polaris Koftware; and Data Transforms Fontix and Printix.

Most of these packages are code based. You insert their codes into a document with your word processor, then feed the document to the text formatter, which translates the codes into a format that your printer can understand.

Typically, these packages let you snake columns, wrap text around graphics, follow typographic rules for justifying text, and use multiple fonts. Some of these packages are also able to import graphics, convert Louis 1-2-3's. PIC files, and cap-

ture graphics from the screen.

Recent trends in word processing are jeopardizing this category of products. Word 4.0, now a major word processing market leader, has added a graphics import feature for placing graphics into columns. The newest version of WordPerfect, which, together with Microsoft Word.

It was the advent of reasonably priced laser printers particularly the introduction of the HP Laser Jet—that gave people the tools needed to present word-processed documents attractively.

dominates the market, will be available by the time this article appears. WordPerfect 5.0 will be able to enfold graphics into text documents, manipulate those images to some extent, and even mix different fonts on the same line.

XWhite is still a favorite among the professional publishing crowd. Since the release of XWhite III in November 1985, the program has been able to mix and match typefaces on a line, use proportional forms of laser primers. The release of Xy-wite III Plas last spring brought Xywite and time documents, giving editors an audit rail of changes to manuscripts. (These products and more are reviewed in "East" of the American Chemistry of the American Chemistry of the American Chemistry of the American Chemistry 2, 1983.)

As word processors get better, the text formatters, which generally are more difficult to use than your favorite word processor, have begun to recede into the background. They will continue to survive for a while, though, as useful sprucer-uppers for less-feature-filled word processors.

The trend is for word processor add-ins, which we will review in a future issue, to replace the text formatters. SoftCraft, for

OUR REVIEWERS

Diane Burns and S. Venit are owners of TechArt San Fransisco, a graphic design and production shop that uses Macintoshes and IBM PCs to produce brochures, newsletters, and books for a variety of corporate clients. They are frequent contributors to PC Magazine and wrote the cover story on Desktop Publishing that appeared in the October 13, 1987, issue.

Edward Mendelson is a contributing editor of PC Magazine.

Robin Raskin is a frequent contributor to PC Magazine. Winn L. Rosch is a contributing editor

of PC Magazine.

instance, has responded to improvements in word processors by issuing print-enhancement programs for WordPerfect and Microsoft Word. The company has even printed the latest version of its documentation using WordPerfect with its add-in product.

Some add-ins include soft fonts such as Hewlett-Packard's Bistream Soft Fonts, as well as those from SoftCraft, Polaris, SWFTE, and VS Software. Other add-in products from SoftCraft and Polaris allow your word processor to take advantage of a laser printer or view printer fonts on-screen in WYSIWYG fashion.

Along with this trend is another type of word processing chancer. Products such as Inset Systems' InSet Plus allow you to capture any type of screen image and merge it into any document for printing. According to the words, the biggsest users of Inset Plus are engineers who need to incorporate drawings and disgrams into letters and specs. Next come financial people who generate spreadtheets and need to include charts and reports, and third, docutation and propers, and third, docutation of the propersy of the proteam of the proteam of the proteam of the propersy of the proteam of the protection of the proteam of the proteam of the protection of the protection of the proteam of the protection of the protection of the proteam of the protection of

DESKTOP PUBLISHING STANDARD Just as Cro-Magnon and Neanderthal man are said to have lived at the same time, the precursor of today's desktop standard evolved during the era of text formatters, typesetting front ends, and early pagecomposition packages.

In July 1985 Aldus Corp. introduced PageMaker for the Mac, selling it bundled with the Apple Macintosh and an Apple LaserWriter. This combination of products gave individuals most of the typographic controls of the earlier page-composition systems and typesetting front ends, but with a much more intuitive interface-developed years earlier at the Xerox Palo Alto Research Center (PARC)-that used drop-down menus, windows, and WYSIWYG displays. It allowed an individual to use a personal computer to compose, revise, and print documents without the expense and time of using a typesetting service

The PC version of PageMaker came out early in 1987. Along with its competitors for the PC—most notably Ventura Publisher—PageMaker attracted a flurry

WORD GETS DESKTOP PUBLISHING

Burger Bill of Fare Fiscer Order By Number French first metaded Colesiaw metaded on request at no charge.		ck & Bagel
I. The Busic Burger43 fb. of choice beel broised & garanded w lettuce, tomato, as onion & pictic on our teasted gara scram- seed but, including konher dill opear	DOUBLE MEAT - MIX or MATCH Available on Request ADD \$1.75	Sandwiches, Sandwiches All served wisoup or solad & chooce o light or dark syr, honey wheet, soundough french roll or open faced bagel
In the Cheeseburgeryour choice of American Cheddar or Swiss method right on	DELUXE SALADS wished formore, must- nome, olives, excumiters & tenned with our own	The "Straw" Specials. Choice of Turkey, Ham, Roant Beef or Kosher Styl Salams combined wiour avocado cheese, alfalfa sprouts, toesstoes & cucumbers
can, Cheddar or Swiss melted on this favorate	w/Cheddar & Sann.\$4.25	The "Vegle" w/our own avocado - crear cheese, siaced fresh mushocoma, affall aprount, somatoes, cucumbers & red couper. \$3.7
mushrooms make this a Gourmer's delight withoute of cheese\$3.7	* Garden Vegetable whean sprouts\$3.25	* Corned Beef or Resben \$4.0
Greek Cyre Bob A delicious Greek specia served on pits bread with excellent BBQ sauc or cacamber dressing, ottom and treasts. \$3.7		* Bacon-Lettuce-Tomato, on lossed bread \$3.5
Quiche Larcsine & Spinach Quiche include	* without of dressing (Blue Cheese 1000 Island,	de pickle spear add choice of cheese 45 special grilling 25
	CRIS POLICY	Manchina
Egg. Onco or Pumperactel	brille Ma	Super Nather
Sagel wildows Loss. St. S. Sagel wildows document cheese special \$2.9	de la contracta	Drian Rings \$150 Frake planty \$12 Fash Filter Happen \$12
Draft Beers Piec Sm. Pl Bollard Briter \$2.00 \$3 Bon Ale \$2.25 \$41 Henry's Li & Dk. \$1.50 \$2 Important Bear	75 \$8.50 90 \$8.75 75 \$3.75	BAR SPECIALS Tequità Stammera \$2.69 Bagel Juste \$2.59 Long Bland Iter & Well Shot \$1.00 Long Bland Ite Tes \$2.50 Burtie & James \$1.75
Amstel 14 St. 40 Chiba	hua	Non-Alcoholic Beverages
Backs Lt & Dk S2.00 Henri Corons \$2.00 Moose	ten	Coke, Sprite & Olet Coke
Doc Enter 1 / A Do 17 60 Pilotes	Lienarii 52 60	Perner Water 51 50 Large lord Tea wlergen 51 50
Fosiers Lager 52.00 Steams	ger \$2.00 15 \$2.00	Grapefrust, OJ, Tomato, Pincapple
Guness Stout \$2.00 Watne	52.00	A Cranberry Jusce \$1.25
		Coller wireful 59
Comestic & Linht Bear But 1:		
Bodycises \$1.50 Miller	ght. \$1.50 Leght. \$1.50	Cultime : fire
Budweiser \$1.50 Maler Ranner \$1.50 Amore	ght. \$1.50 Light. \$1.50 \$2.60 Wolf Light \$1.73	Caffenc - free

Word processors increasingly incorporate sophisticated text-forming features. The menu above was created with Laser-Set, the one below with Microsoft Word 4.0. Although Word is weak on display type and variable width columns, it can box text and mix fonts and sizes on a single line.

		Refreshment	s from the Ba	r
Draft Beers		Sec. Pitcher	Le. Pitcher	BAR SPECIALS
Ballard Bitter	\$2.00	\$3.75	\$5.56	Topalla Slammers
Bass Alc	\$2.25	\$4.00	\$5.75	Bagel Juice \$2.50
Hoary's Lt & Dk	\$1.50	\$2.75	\$3.25	Import Beer & Well Shot 3.00
				Long Island for Ten
Imported Beer				Bartle & James
Ametell U		Chichushua		Non-Alcoholic Severages
Books LI & Dk		Heineken	52.00	Cohr. Serite & Diet Coh
Corona		Moosehead	\$2.00	Perrier Water \$1.50
Dos Egein Lt & Dt	\$2.00	Fibracy Unesch	\$2.00	Large leed Ten w/lemon90
Fosters Laser	\$2.00	Waters.	52.00	Grapefruit, OJ, Tomato Pincapole
Cuincu Stort	\$2.60			& Crasherry Juice\$1.25
				Coffee w/refitt 50
Domestic & Light Beer		Bed Liebt	\$1,50	Caffeine - Free
Budweiter		Miller Light		Hot Cocoo
Rainier	\$1.50	Amnek	\$2.00	Milk. 90
Rolling Rock	\$1.50	Nordik Wolf Lieb	\$1.25	Ten small pot 60

of attention in the press, in trade shows, and among businesses who wanted to use these programs to produce newsletters, presentations, and all sorts of business documents.

LOWER-END SOLUTION The chinks in the armor of the PageMaker/Ventura market are price and ease of use. Page-Maker for the PC sells for \$695 (\$300 street price); Ventura Publisher goes for \$895 (\$400 street price). To really take advantage of these programs, you'll also need a laser printer, which can cost over \$2,000. In many cases, users will want to upgrade their systems to include a highresolution monitor, a mouse, and a scanner in addition to the laser printer. Because mixing and matching products that support various standards is difficult, some companies have begun to offer prepackaged hardware, including monitors, printers, scanners, and sometimes the PC itself, as well as either PageMaker or some other DTP package. Such desktop publishing systems include IBM's SolutionPac Personal Publishing System and Advanced Vision Research's Pagemaster, but these are expensive, ranging in price from \$2,500 to \$8,500, depending on the included options. If the equipment costs didn't prove intimidating for some users, the heavy emphasis these packages place on such professional typesetting tasks as kerning and leading did.

Enter the lower-end solutions: Ashton-Tate's newly released Byline and DRI's GEM Desktap Publisher. According to Ashton-Tate, Byline was developed not as a professional typsetting tool but as a tool that could be integrated with the machines and software programs that people already have. Byline (as well as the other software in the lower-priced categories) works with CGA, EGA, and Hercules adapters as well as 9- and 24-pin dot matrix printers, and it doesn't require (or even support) a mouse. The package works with the software most people already have-including Latus 1-2-3, MultiMate, WordPerfect, XyWrite, and a number of graphics programs, though excluding Microsoft Word-and not surprisingly, it works with dBASE .DBF files. Also, it lets you take multiple records and merge them into your documents. And at \$295, Byline's price tag is

one that most people can live with comfortably.

the Britise, GEM Decktop Publisher or was designed to be integrated to be integrated or was designed to be integrated to be integrated to work with GEM to other graphics tools, including GEM Draw. GEM Graph, GEM Word Chart, and GEM Paint. The only way you can import graphics from other software, such as 1-2-3 PCI (Bies, PC Paint, Publisher's Painthreath, and others in through a SSD add-in program. ALS 395, GEM Desktop Publisher is more expensive than Britisher, but is also easy to use. Its

Both GEM DTP and Byline are designed to spiff up all kinds of corporate documents, including those that incorporate text and graphics. Compared with more expensive packages, however, they are limited.

greatest strength is text formatting, done through style sheets. These let you create formatting definitions for headings and paragraphs within text.

Both GEM DTP and Byline are designed to spiff up all kinds of corporate documents, including those that incorporate text and graphics. Compared with more-expensive packages, however, GEM DTP and Byline are limited. Neither offers graphics tools to speak of, nor does either include many automatic features common in state-of-the-art word processors, such as automatic footnoting. Though the new version of the GEM interface (still in beta version at the time of this review) offers more type fonts than the old version had, its fonts as well as those of Byline are limited. Both packages can import files from a number of word processors, but they ignore the formatting. Neither program can automatically handle drop caps or footnotes, and Byline imposes

a 50K limit on graphics files—too small to handle the PC Labs test graphics.

Britine, GEM Deskiop Publisher, and pergentialer which differs from the other two in its need for the Tail Tree Systems' Jackser and an aspecific type of Caroline Ricco haser princer) all offer output that As you can see in the benchmark-test newsletters printed here, the output of these packages is no match for the likes of PageMaler. So you should sersoully consider whether it in it worth the cauta time should be a supported by the property of the property

LOW, LOW PRICES Down a notch in price—at the \$100 keed—you'll find an other cluster of packages: Unison World's NewMaster. Springboard Software's NewMoorn Pro, and Software Publishers (the Publisher the Publisher the publisher man for PFS-ElickArr). At this keed, the mane of the game is essee of use, lightning-last reside, and low, low prices, Julie most that copromite users buy FFS-Flat notes that copromite users buy FFS-Flat Publisher to handle the paste-up work they once did by hand.

The catch, of course, is functionality. These packages have WYSIWYG displays that let you set margins, wrap text around graphics, align paragraphs, create fonts, and use symbol libraries (otherwise known as clip art). But the output tends to be amateurish.

Two of the packages have limited graphics tools, such as rectangles; News-Master has none. Only PFS:First Publisher can import graphics images from other sources. In each case, text import is limited to ASCIL and the packages lack kerning, automatic hyphenation, headers, and footers. All three packages, designed primarily to work on dot matrix printers, offer just 75-dot-per-inch resolution; hence, even if you print on a laser printer, you won't be able to do better than that with them. We did, in fact, print the test newsletter created with these packages on both a dot matrix and a laser printer. The quality of the dot matrix output was not much different from that of the laser printer, though neither was very good. Despite the limitations, the products in

If you can see the difference, you must be looking at the price.

we never stop asking

Hewlett-Peckerd Company 18110 S.E. 34th Street Camas, WA 98607 Deer Reeder: This letter was printed on two of the finest printers available today. One half on elser printer, the other on the naw HP DeakNat Printer. But which one printed which helf? Hard to tell, ien't it? Small end quiet anough for your own desk, our HP DeakJet Printar gives you clean, criep text end grephics. Just like a leeer. You get parfact printing from A to 2. Look for yourself. Ansbeeddear JjKkLlMm NnOoPpQc AVVMVXXYYZZ So which helf is from the laser pr inter end which from the HP DeskJat Printer for under \$1,000? Not sure? That's the point. To ase tha difference you've got to look at the price. So call for the mame of your local desier and a free brochure on the ne HP DeskJat Printer at 1 80 752-09 00 Ext. 905A. HEWLETT-PACKARD COMPANY Grag Wallace Grag Molloce Lager Printer HP DeskJat Printer

The New HP DeskJet Printer. Laser-Quality Output for Under \$1000.





this category seem to have hit a market chord. When this article went to press, PFS:First Publisher had made the PC Magazine top-ten best-seller list.

PUBLISHING BY DESIGN Sometimes the easier a tool is to use, the more destructive it becomes. So it is with desktop publishing. Many users have shot off desktoppublished documents without learning the principles of good design, and their efforts

show it A few wise vendors have begun to offer layout support as well as software support. If you're not a graphics artist, you might want to consider one of the packages that include such help. It may prevent you from turning out documents that work against you rather than for you. Byline, for instance, comes with on-disk standard business templates as examples of well-designed documents. Both Byline and GEM Desktop Publisher include sample layouts for you to adapt to your individual needs. These layouts let decision-makers or designers develop templates with certain fixed elements, as well as containing areas for users to customize. PFS:First Publisher's sample disk takes you through a layout step by step.

TESTING THE PRODUCTS As in previous issues, we compared all the products with PageMaker, though in this version we use PageMaker for the PC rather than the version for the Mac as the standard. We used all the packages to create the same standard newsletter we used in previous issues (see "Desktop Publishing Comes of Age," PC Magazine, October 13, 1987). But we produced the full newsletter only with GEM Deskton Publisher. Byline, and PageBuilder. With the lowerend packages, we produced the first page only, since, as you'll see from the reviews. these packages had few of the features necessary to create the entire newsletter.

The results of our tests are discussed in the following reviews, which are arranged in the categories of Mid-Level DTP and Low-Level DTP. Within each category, reviews of the products appear alphabetically by product name.

Cheryl J. Goldberg ts an associate editor of PC Magazine.

MID-LEVEL DESKTOP PUBLISHING PROGRAMS

Byline

Even at the low end of desktop publishing programs (529), Ashton-Tute's Byline is unusual. Although it gives a clear WYSIWYQ preview of what will appear on paper—or most of it—it lacks mouse control. But unlike the print-formatting programs that it more closely resembles in features and capabilities. Byline gives you interactive control over each page. Instead of embedding control codes throughout you cannot be control to the control over the program so only a few specific to the foreign most only a few specific programs and the foreign most of the first throughout you for the control over the program so of the first two control each sheet.

Although Byline can be used effectively to lay out pages for everything from form letters to newsletters to books, it has severe limitations. Its graphics abilities are unsually restricted. It lacks many automatic features, such as automatic footnoting, that are standard even among state-of-the-art word processors. And it generates only portrait-sixtly meal lavouts.

The first taste of this strange soup, however, is promisingly, if not refreshingly, different. Rather than blindly following the Macintosh school, Byline looks as if its iconoclastic developers have taken a fresh





Byline, Version 1.0 Ashton-Tate 20101 Hamilton Ave. Torrance, CA 90502 (213) 329-8000 List Price: \$295

Requires: 384K RAM, two disk drives, graphics adapter, DOS 2.0 or later. In Short: A desktop publishing system with good text and minimal graphics editing capa-

in short? A cestop potnisning system with good text and minimal priphics editing expobilities, designed to integrate and enhance the print quality of documents from word processors, spreadsheets, and databases. Does not support a minuse Not copy proceeted. ORICLE MACHINE PROPERTY SPACE. approach to the task at hand. While the Mac does, indeed, work well for desktop publishing, it is not necessarily the only or the best means of accomplishing that end.

A SCREEN DIVIDED For the most super, the Bythme interface divides your video display in half. One side of the screen (for instance, the left half when you work on cold-numbered pages) is devoted to a text-only menu; the other side, a representation of the printed page. The menu changes with different "views," which allow you to manipulate various parameters addition, 8 yillow gives a "Spread View" with two pages side by side. A magnified "Zcome-d" looks at any view.

Byline builds pages from elements: these can be either blocks of type (text elements) or graphics (photo elements) captured from the screen or generated with a program compatible with one of several supported file formats, such as PC Paintbrush (including scanner-generated images using this file formats, Publisher's Paintbrush, MacPaint, Windows Paint, and Laust 1-2-3 PC files.

You indicate numerically all text and agraphies positions and character sizes and syles by directly typing in values (in inche, centimeters, points, or pica) or by choosing figures from a context-sensitive context of the context of

For text elements, Bythe's mems altow you to specify the file holding the text, the type size to be used, the typeface, leading, and borders. Five typefaces are insured to the size of the type size of the size of the size of the size of the type size of the size of the size of the size of the type size of the size of the size of the size of the type size of the size of the size of the size of the type size of the siz

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Byline bypasses the usual drop-down menus and gives you a graphic image of the current page on one side of the screen and a text-only menu on the other.

Each text element can have up to four different type styles-body type and three levels of headings. Byline considers italic, boldface, underlining, super- and subscripts, and strikeout characters as variations within a type style, so the limit of four is not as large a constraint as it sounds.

These four variations of type style and the character type variations are marked within your original text files with special embedded commands. The heading level, for instance, is set by beginning a line with one, two, or three colons.

Byline recognizes file formats of the most-popular word processors-including MultiMate, WordPerfect, WordStar, and XyWrite-but ignores their formatting and print control commands, and it can't read documents from Microsoft Word. While you can enter the necessary Byline embedded commands with your word processor. Byline provides its own text editor that you can use to alter existing text files or create new ones

The program implements running heads in two ways. You can specify the text used in one level of heading to be a running head, or you can build master pages (including separate masters for even | mented limitation of graphics file size to |

and odd pages), which can be merged with each ordinary page at print time. System variables-such as the time, date, or page number-can be automatically inserted in these headers or within body text.

Because Byline merely links text files to the page formats that you lay out from text and photo elements, you can change the text independently of the layout. After you lay out a single newsletter, you can automatically create subsequent issues with the same style just by substituting different text (and graphics) files with the same names as the ones you used for the first publication.

SCALED GRAPHICS Byline's graphics editor allows you to view images and choose small sections of larger pictures. Images are automatically scaled to fit the size of the photo element. Except for this slice-and-dice ability, Byline does not include any drawing aids or other image manipulation abilities. At best, you can draw lines and borders (some of them rather elaborate), but you can't even fill an area with shading.

Worse, however, is Byline's undocu-

50K. The program's author. Ken Skier. claims this limitation applies only to .PCX files; Ashton-Tate makes no such claim. But during testing, all graphics file formats ran into the same wall. Byline won't even load larger graphics to let you cut them down to size.

Somewhat offsetting these drawbacks is the inclusion of a screen grabber called Camera. Making use of this particular feature means that anything you can display on your monitor can be incorporated into your final document, albeit with its resolution limited to that of your video display. Byline cannot automatically handle

drop caps or footnotes, although you can do either by dedicating an element to each. The program does not support automatic hyphenation, but you can use its text editor for touching up really ugly line break's, Byline automatically kerns its proportional fonts and allows you to adjust its kerning tables, the effects of which are global. You cannot individually kern the characters within a headline

The entire Byline installation process is governed by a set of batch files that mysteriously do their work without letting you in on any of their secrets. When all goes well, the process is elementary; when it doesn't, it's a riddle that even Oedipus wouldn't be able to figure out-particularly since the documentation gives no indication of what files you need and where.

COMPATIBLE, SUPPORTIVE Perhaps Byline's strongest suit is that it works with the hardware that you most likely already have. It supports CGA, EGA, and Hercules displays as well as the Wyse WY-700/Amdek 1280 high-resolution monitor. It also supports both 9- and 24pin dot matrix printers, as well as Hewlett-Packard and PostScript laser machines. Once installed, the entire program occupies less than 700K of disk space.

If you've worked with other desktop publishing packages, Byline will seem weird indeed with its novel interface. Whether that's bad, better, or just different, only you can judge. Within the limitations of its features, however, Byline will allow you to create fully formatted documents without ever making your fingers wander too far from the home row. -Winn L. Rosch

Every presenter wants to make a compelling, persuasive case. And color,

you'll agree, makes all the difference. It's more eyecatching. More readily under-

stood. More memorable. In short, color makes any desktop presentation more effective.

And research proves it.
All you need is a Hewlett-Packard
ColorPo Plotter like we used here, or
the HP PainLet Color Graphics Printer.
Together with a PC—IBM compatible
or Apple Macintosh—you can use all
the popular graphics software like
Lotus Freelance Plus, Cricket Presents,
HPS Graphics Gallery (used below),
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	Newsroom Pro	PFS: First Publisher	NewsMaster	Byline	GEM Desktop Publisher	PagaBuilder
Allows WYSIWYG display	0.	•	•	•	•	•
Allows WYSIWYG aditing	0	•	•	0	•	0
Allows heavy editing throughout production	•	•	•	•1	•	•1
Imports and lays out multiple pages of text to one step	0	•	0	•	•	•
Uses style sheets to formet text	0	0	•	•	•	•
Does bit-mapped graphics	•	•	•	•	•	•
Does vector graphics	0	•	0	0	0	•
The O-No "Partial display-can proview or	ne column or headline at	a time. *Does to:	d editing, not graphics	editino. [‡] Does o	achics editing, not text ed	itino.

GEM Desktop Publisher GEM (Version 2.2) is a graphics environ-

ment-basically a unified set of routines for programmers to exploit that give their products a polished look and a uniform, easy-to-use graphics interface. Digital Research offers several applications based on GEM that make up a modular system designed to handle most PC chores.

Of these, GEM/3 (the newest version, which will be available by the time you read this) serves as a front-end control program, giving Macintosh-like mouse control and graphics-based pull-down menus to the normal operation of your system. GEM Desktop Publisher is a separate program designed to lay out both text and graphics created by other software, both GEM-based and otherwise, using the GEM routines and interface. GEM Desktop Publisher achieves its

low \$395 price because it depends on other programs for the initial preparation of document elements. It lacks all but rudimentary text and graphics editing capabilities, although it will work with files generated by a variety of other editors.

In effect, GEM Desktop Publisher is both typesetter and keyline artist. It prepares your printed page by turning manuscript into typeset copy and pasting on the page. It sizes and crops graphics from the photographer (via a scanner) or artist (via a painting or drawing program). The final pages are then sent to the printer-in this case, a GEM printer driver. As a consequence, the fate of GEM Desktop Publisher is intertwined with that of the GEM environment. Since the environment's recent major upgrade, GEM Desktop Publisher

takes better advantage of the marriage. Included with GEM/3 (not GEM 2.2) is

Bitstream's Fontware, which manages typefaces. Another program, FontMerge, creates width tables that define the sizes of type available to GEM Desktop Publisher. These additions allow the program to handle more typefaces (up to nine) than before with a much greater variety of type sizes. now primarity limited by your printer.

UNLIMITED TYPE SIZES GEM/3 will have improved PostScript support; type size choices will be virtually unlimited: any integral size from 6 points up. (According to Digital Research, sizes up to 999 points are possible, though they've been tested only up to 255.) Other printers





Digital Research Inc. P.O. Box DRI Monterey, CA 93942 (800) 443-4200 (408) 649-3896 List Price: \$395

Requires: 512K RAM, (640K recommended), hard disk drive, graphics adapter, DOS 2. Lor later In Short: An easy-to-use graphics-based

WYSIWYG desktop publishing system that includes a text editor. Its style sheets are a particularly strong feature. It offers limited graphics manipulation and is designed primanly to support other GEM-based graphics applications. Not copy protected.

are more limited. GEM/3 will also take advantage of Hewlett-Packard soft fonts. It will handle high-order ASCII codes and sheets up to legal size. And GEM Desktop Publisher now features font paging, which allows it not only to accommodate more fonts but to load faster

Improved PostScript support also means greater output speed-from two to four times as fast-for any application running under GEM/3 (including GEM Deskton Publisher). In addition, both printer and plotter (HPGL) output can be captured to a file for later use.

The bulk of the code and operation of GEM Desktop Publisher remains unaltered, however. As with other programs in its genre, with GEM Desktop Publisher you work with a video image of the page you're working to create, using a mouse (or other pointing device supported by GEM, including cursor keys) to choose functions by pointing at icons or menu selections and to move elements around.

The program works with pages in both portrait and landscape orientations. Four different page views are available, and you lay out each page as a series of rectangles. First you mark out a rectangle in normal mouse-control fashion by anchoring one comer and pulling a "rubber-band" box down to the opposite end of the area you want to mark. Several aids help you get the exact positions you want, including a display of coordinates immediately adjacent to the on-screen pointer.

CLICK AND FILL Once a rectangle is marked, you can fill it with either text or graphics by choosing its contents through a



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MODEL KE-300

- HIGHEST QUALITY TEXT AND GRAPHICS
- EMULATES 9 POPULAR PRINTERS
 300 DPI FULL PAGE GRAPHICS
- SCALABLE FONTS TO ANY SIZE

PROJECT: CRYSTAL VIEW

MODEL 1901/TX-1280

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 1280 x 960 RESOLUTION
- 1280 x 960 RESOLUTION
 INTEL 82786 GRAPHICS CO-PROCESSOR
- DUAL PAGE DISPLAYABLE

PROJECT: CRYSTAL SCAN

MODEL 3001/MAC

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- 64 GREY LEVELS
- OPTICAL CHARACTER RECOGNITION
- IBM AND APPLE MODELS AVAILABLE

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Low-Cost DTP Programs: Summary of Features (continues) (Products listed in ascending price order)

	Newsroom Pro \$79.95	PFS:First Publisher \$99.00	NewsWester \$99.95	Byline \$295.00	GEM Desitop Publisher \$395.00	PageBuilder \$495.00
No. of pages per document	1	99	4	>800	100	70
Color options	0	0	0	0	•	•
TEXT FEATURES						
Yext formatting						
Links page layout to text files	0	0	0		0	
Retains some word processor formats	0	•	0	:	0	0
Retains indents and table from word processor	0	•	0	ō	ő	•
Retains typefaces from word processors	0	•	0	0	0	0
Imbeds type codes	ō	ō	Ö	•	•	•
Has style sheets	ō	ō	Ö	•	•	
Uses dictionary hyphenation	0	0	0	0	0	0
Uses logic/formula hyphenation	o o	o .	o o	0	o o	õ
Hyphenates foreign lenguages	o	0	0	0	0	0
Has kerning tables	Ö	ě	0	•	Ö	0
Allows manual kerning	ŏ	ō	Ö	ō	ŏ	(in head- lines only)
Increments by leading	None	Viz inch	None	1 point	Mee inch	None
Dhs	0	•	0	•	•	•
Tab leaders	Ö	0	0	•	0	0
Max. no. of typefaces	5	ă.	12	5	Unimited	4
No. of typestyles	3	3	34	4	4	3
Small caps/all caps	0	•	•	0	0	0
Superscript/subscript	o .	•	O.	•	ō	ō
Reverse type	0		0	0	•	•
Size range (points)	8-32	4-72	8-60	6-144	6-72	3-24
Size increments (paints)	8, 16, 32	Depends on fonts used	8, 10, 12, 24, 60	Integers	Integers	5 predefined sizes
Text editing						
Edits text globally	•	0	•	•	0	•
Changes type specs globally	0	•	•	•	•	0
Changes paragraph form globally	•	0	0	•	•	0
Has undo command	•	0	•	(last delete)	0	•
Text import						
ASCII	•	•	•	•	•	•
DCA	0	0	0	0	•	0
Microsoft Word 3.0	0	0	0	0	0	0
MultiMate	0	0	0	•	•	0
WordPerfect	0	0	0	•	•	0
WordStar	Ö	0	ō	•	•	o
Xerox Writer	o .	o .	0	ō	ō	ō
XvWnte	0	0	0	•	ō	o o
Windows Write	ō	0	0	o	0	0
GEM Write	ō	ō	0	0	•	0
Other word processors	None	PFS: First Choice, PFS: Write, PFS: Professional	PrintMaster Plus	None	None	None

indicates Editor's Choice - No "For PFS' First Choice and PFS. Professional Write PWith The Graphics Link from PC Quilk Art. "With optional driver pack from Digyes

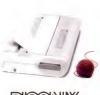
	Newsroom Pro \$79 95	PFS:First Publisher \$99 00	NewsMaster \$99.95	Byline \$295 00	GEM Desklop Publisher \$395.00	PegoBuilder \$495.00
GRAPHICS FEATURES						
iraphies import						
(.DXF) AutoCAD		0	0	0	(X	•
(DRW) Windows Draw	10	0	0	0	•,	
(.GEM) GEM Paint, GEM Draw, GEM Graph		0	0	0	•	
(PIC) Letus 1-2-3		0	0	•	•'	
(PIC) In*e*Vision			0		• '	
(.PIC) PC Pant		•	0	9	•	10
(.PCX or PCC) PC Peintbrush		•	0	• (50K max length)	•	•
(.PCX or PCC) Publisher's Paintbrush		•	0	•	•	
(.MSP) Windows Paint		•	0	•	•	
(.IMG) Halo DPE			0			
(EPS) Encapsulated PostScript			0		0	
(.TIF) Scenned images				•	•	•
GDI Metafiles				O.		
HPGL					0	0
Mecintosh PICT MacPaint		:		(2)	(0)	.0
	0		0	_•		0
luit-in graphics elements No. of rules	5	4	None	Unlimited	None	Uniomited
Reverse rules (white lines)	O.	1	None	O.	None	Chimines
Rectangles						
Rounded corners		101	0	(0)	0	
Circles/avals						•
Pelygons			0	10		•
No. of fill patterns	10	None	30	None	9	9
Freehand-drawing options	•					•
Trephics meelpulation						
Scaling	•		•	•	•	•
Cropping	•	•	•	•	•	•
Rotation			● (180 degrees only)			•
Undo	•	U	•	0	0	•
PAGE LAYOUT FEATURES		-		404-04		Hallman 4
Mex. no. of columns Wlows unequal column widths	2	4	10	Unlimited	4 per rectangle	Untimited
Adjusts text It columns change				:		
Autometic text tlow	•	0	•	•	•	•
Stores text overflow		•	•	•	•	•
Inserts/removes pages				•	•	•
		51		•	100	•
	0	•	0	_•	•	•
Headers/Iooters						
Headers Tooters Autometic page numbering	0	b	0	•	•	•
Headers Tooters Autometic page numbering Autometic Index generation	0		0	0.5	,0.	6
Reerranges pages Headers Vooters Automatic page numbering Automatic Index generation Automatic table-ol-centents generation Automatic tootnating	0					6

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■ MID-LEVEL DTP

Low-Cost DTP Programs: Summary of Features (Products listed in ascending price order)

	Neweroom Pro \$79.95	PFS:First Publisher \$99.00	NewsMoster \$99.95	Byllee \$295.00	GEM Deskiep Pablisher \$395.00	PagaBailder \$495.00
PAGE LAYOUT FEATURES						
Automatic figure numbering	0	0	0	0	0	0
Automatic window/orphan control	0	0	0	0	0	0
Automatic continued lines	0	0	0	0	0	0
No. of refer measures	None	44	None	4	2	Unlimited
Shows cursor position on ruler	0	•	0	0	0	0
Shows cursor coordinates	0	0	0	•	•	•
Shows size of a selected graphic	•	0	•	•	•	•
Stores unused text/graphics in a list or pasteboard	• (both)	(both)	(both)	 (pastaboard) 	• (list)	(stores in file only)
PRINTERS SUPPORTED						,,
Lacer printers						
AST TurboLaser	0	0	0	0	0	0
Canon LBP-8A1 and LBP-8A2	0	0	0	0	O	0
Cordata printers	0	Ö	0	Ö	O	Ö
Epson GQ-3500	0	•	0	0	•	0
HP LaserJet and compatibles	•	•	•	•	•	0
IBM Quietwriter Models 2 and 3	● (Model 2 only)	•	0	0	OF	Ö
IBM Pageprinter	0	ō	0	Ö	O [‡]	Ö
Interpress printers	0	0	0	0	0	ō
Apple LaserWriter	•	•	0	•	•	0
Other PostScript printers	0	•	0	•	•	0
Printwars Model 720IQ	0	0	0	0	0	0
Ricoh PC Laser 6000	0	0	0	0	0	o
Ricoh LP 4080R	0	0	0	0	0	Ó
Xerox 4045 Laser CP	ō	Ö	o	Ö	0	0
Laser printer controller board						
Tall Tree JLaser	0	0	0	0	0	•
Color ink jet printers						
Diablo C150 color ink jet	0	0	0	0	•1	0
HP ThinkJet	ō		•	ō	•1	o .
IBM Color Jetorinter	ō	ō	ō	ō	•	o
Quadram Quadiet 9000	Ö	0	o o	o o	•1	o
Xerox Model 4020	Ö	Ö	Ö	o	•	Ö
Other color ink pst printers	ō	•	ō	0	•	ō
Dot matrio printers						
Apple ImagsWriter	0	0	0	0	0	0
Epson FX-80	•	•	•	•	•	0
Epson LQ	•	•	0	•	•	0
IBM Proprinter	•	•	0	•	•	0
Other dot matrix printers	•	•	•	•	•	o
Other devices						
Diablo 630 Daisywheel	0	0	0	0	•	0
Plotters	0	0	0	0	••	0
Polaroid Pelette film recorder	0	0	0	0	•	0
Max. no. of printers	70	1	175	3	3	1



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All Enteropes for JOH Vinesa Park Av. Scarburgs, Ostava Canada MON JOS Tol. 1800 25-0711 Tain Common Park (MM 279-1870) To some people, the difference is obvious.





66 For sheer power, ease of use, speed, and flexibility, you would be hardpressed to find a more capable product, es-

pecially if you need advanced features. It works just as well with a half-dozen spreadsheets simultaneously as it does with one. 22

-InfoWorld

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GEM's style sheets determine the typographic formats used for each copy block or paragraph. Stored separately, style sheets can be shared among different documents.

menu-like directory displayed on the left of the screen. In the click of a mouse, your rectangle will fill with text. Graphics processing may delay your work for a few seconds.

Typically a text rectangle will completely fill with a mondescript display in generic body type. Although it undestands the formats used by several word processors—among them GEM Write. Multimate. RFT-DcA format (for example. DisplayWrite). WordProfert, and Wordson—GEM Destand Publisher uses more standard to the control of the control displayed. GEM Destand Publisher creates a new file with all these special codes praged.

You add headlines, subheads, and other typographic variety by assigning style sheets, which specify type style, size, and other characteristic (falle), boldface, underline) to paragraphs—which can be single letters, lines, or even multiple paragraphs. In addition, with GEM Desting— Publisher's internal editor, you can alter the style of individual characters, words, and phrases. You can also add now text to

existing files (but you can't create text files) and manually add conditional hyrhens to words.

Specified print enhancements and style sheet assignments are automatically coded into the special text file created by the program. You can also embed these GEM Desktop Publisher print commands in your original file as created with your own word processor. The style sheets themselves are stored separately so that they can be used by all your documents to add a consistent took.

Text automatically flows from rectangle to rectangle—and, accordingly, from page to page—when you select the same file for more than one. Text within a rectangle can be automatically divided into up to four columns.

to lour columns.

FLUID RECTANGLES But even after you've filled them with text, rectangles are not forever fixed: you can slice out a section of one by laying a second, opaque rectangle ever part of it. (FIGM Desiting Publisher reacts by automatically flowing text around the cutout area. You can trim the bottom of a column for a continuation

message just as easily. Alternately, you can lay a transparent rectangle over another one, which merges the contents of the two rectangles.

When you read a graphics file—either a pixel-based picture or GEM Draw-format vector drawing—into a rectangle, GEM Desktop Publisher automatically sizes the image so that it fits into the area you've as-

GEM Desktop Publisher achieves its low price because it depends on other programs for the initial preparation of elements.

signed. The graphic is either reduced in size to fit or cropped without altering its scale at your option.

GEM Deskiop Publisher does not automatically handle drop caps, footnotes, indexes, or tables of contents. Nor does it permit manual kerning. It does, however, allow running beaders and footers (including different ones for left and right pages). The program considers these graphics files, allowing you to add logos and the like but requiring the use of a graphics program (GEM Draw) to create any besides the included prototyress.

Another of the improvements bequestable to EMD Deskop Publisher by the GEMJ system upgrade is a simplified installation and modification procedure that's completely prompted and menucontrolled. You must go through this initial scutp to configure GEMJ for your system, matching input and output devitem, matching input and output deviprom GEMJ3, you then install GEM Desk-From GEMJ3, by other install GEM Deskposition. The rest of the procedure is automatic.

Compared with more-expensive desktop publishing programs, GEM Desteop Publisher is light on features. Many of its cations, but a few that you may find important Lautematic freetneding, indexing, and so forth) are not. Choose GEM Desteop Publisher for its simplicity and ease of use.—Winn I, Rosch



Rated #1 business graphics package second consecutive year. - Softwore Digest

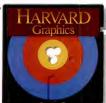


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PageBuilder

Blend together strong doses of drawing, charting, and electronic typesetting, and you'll have a good idea of the concept behind White Sciences '\$495 Pagebuilder. The program combines these types of graphics-based applications to offer page composition abilities that lack only automatic features and some of the text versatitiv of the high-end publishing packages.

PageBuilder doesn't follow typical graphies and output standards. While most desktop publishing programs operate under either the GEM or Windows environment, PageBuilder incorporates its own intrinsic graphics routines. Each version of the program works with only one video standard, and versions are available for Hercules, EGA, Wyse 700/Ambek 1280, Genius, Sigma 400, and Tseng EVA 480 systems.

While most high-end publishing packages rely on the PostScript page description language for their best-quality output, PageBuilder works exclusively with Tall Tree Systems' Llaser board and with laser printers based on either the Canon CX or Ricoh 4080E engines, such as Hewlett-Packard's Laserlet. A pointing device is



You can move the PageBuilder menu to any position on an otherwise unstructured display. But th less-than-intuitive icons need improvement.

serial mouse.

TABULA RASA SCREEN PageBuilder is more like a drawing program than like desktop publishing—the screen is a tabula reas availing your images. A series of menus—mostly made of oxymoronic text icons—controls most functions, but unlike most programs of its type. PageBuilder allows you to slide the menu easily wherever you want on the screen.

also recommended: either a touchpad or a

While drawing and image placement are best handled with pointer control, you can also type numbers to move the graph-to-coursor. The normal range of drawing primitives are available (times, boxes, as free-form images) along with image manipulation functions like scaling, rotation, and image reventing. PrageBuilder allows direct control of scanners and also handles the importation of scanner and PC but the properties of the properties of the properties of the control of the control

To add business graphics, PageBuilder has built-in charting abilities that allow you to enter numbers directly using a spreadsheet-like interface or to import

.DIF (data interchange file) files. Supported chart types include clustered, stacked, and horizontal bar, line, pie, and x-y scatter types.

In many ways, PageBuilder's text-handling abilities are limited. Although text can be readily flowed in columns and even around graphics, only two justification options are available: fully justified and ragged right. You must choose the typeface to use before text is flowed-although you can delete it and immediately reflow in another typeface if the results of the first are not pleasing, or you can insert typeface changes as you go along. Embedded textcontrol codes can be used (for instance, to put boldface into the middle of a sentence) by specifying one of PageBuilder's typeface names between backslashes in your original document.



Poge Builder, Version 1.0 White Sciences In Two West Alameda Tempe, A& 85282 (602) 967-8257 Jenner Last Price; 5495 Regulares; 384K RAM, a pointing device, Tall Tree System II.aser

board, DNS 2.0 or later. It as Short it clade the other systems reviewed here all of which rely on the PostScript page. Security of the special post of the product requires a Hazer board and later printers based on the Tamor Co. or Rose of the Company of the Feature of the Company of the Feature of the Post of the Company of the Feature of the Post of the Company of the Feature of the Post of the Po

CRICLE 660 ON READER SERVICE CARD



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can save the purchase price of expensive 1 soft fonts.

IMMEDIATE CHANGES PageBuilder integrates with your word processor by allowing you to bounce directly between the two, so you can make immediate changes in your text. Any alterations are immediately reflected in your document because PageBuilder links the text to your publishing files and generates a series of very short (2-byte) files that define the breaks between blocks of text in your document. PageBuilder expects to get a very particular form of generic ASCII text, requiring you to double-space between paragraphs and use a very specific text-file name

While PageBuilder's justification and type-size options would seem to limit headline versatility, the program makes up for its deficiencies with its graphics flexibility. By the simple expedient of treating your headlines as graphics, you can position them anywhere, manually kem them using graphics controls, and manipulate all other graphics parameters-expanding, reducing, and even rotating-as your taste inspires you.

The program uses two special pages when creating documents. A "backdrop" page is a layout sheet that specifies the locations of frames to flow text into. Page-Builder includes 12 default backdrop pages and allows you to individually replace them with 12 custom layouts of your own. (You can keep the originals-or as many custom layouts as you want. They just won't be immediately available.)

A "base" page includes text and graphics features that are to appear in common among the pages of a document-running headers, footers, rules, page numbers, logos, and the like. Automatic page numbering is available, including special placement for left-hand and right-hand pages.

MANY FILES PageBuilder can be described as file-intensive. It creates many files with very specific names (while PageBuilder's advanced mode allows filenaming freedom, you may want to stick with the program's nomenclature to avoid confusion) when you edit documents. The scheme limits you to working on four documents of up to 70 pages each, plus an ex-

tra "immediate" document, without reverting to DOS to move and rename files. The program also has limits for the number of graphics images (280) and text files (60) it can handle without requiring you to exercise your fingers through DOS. Page-Builder is best at shorter documents, but vou can work with as many pages as you want by dividing your work among several documents and disks

Overall. PageBuilder is a unique and specialized graphics-based publishing system and one that can be the most cost-effective for existing systems. The key is the JLaser board, which means you don't need to add a \$5,000 PostScript printer to get full-page, high-resolution graphics that rival the look of the high-end desktop publishing packages .- Winn L. Rosch

LOW-LEVEL DESKTOP PUBLISHING PROGR AMS

NewsMaster

Not everyone needs full-featured desktop publishing-or can afford it. But even on shoestring budgets, aspiring William Randolph Hearsts or Rupert Murdochs can achieve interesting and lightning-quick results by using NewsMaster.

From Unison World, NewsMaster is an easy-to-use WYSIWYG nackage canable of creating multiple-column newsletters with a selection of built-in fonts and clipart images. At \$99,95, designed with the budgets of the dot matrix crowd in mind. the program supports a robust set of dot matrix printers. The only laser printers supported are the HP LaserJet and Kyocera's laser printer. Laser output is 75 dots per inch-dot matrix quality.

Calling NewsMaster easy to use is an understatement. Once you decode the bizarre icons guiding you through the menus, you can create a newsletter in about 15 minutes. You are provided with a default single-headline, two-column format, and you may redesirn the pare to ac-

commodate up to ten vertical columns. You can import ASCII text or enter built-in fonts. Although text can be edited. resized, justified, and wrapped around graphics elements, there is no control over the more "micro" types of functions, such as horizontal- and vertical-spacing incre-

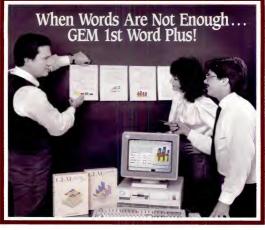
AUTOMATIC FLOW Editing is done by selecting a block of text and then either cutting, pasting, copying, or resizing the text. Flow from one column to the next, or one page to the next, is automatic. Resnecify the size or type of the text, and the flow

Graphics cannot be imported, but some degree of artistic choice is granted through more than 100 clip-art pictures. However, most of them are whimsical cartoons: there are Puzzle Pieces, Weird Bugs, and Super Gal and Guy-not the sort of images most corporate offices want. Apparently, News-Master is intended for informal presentations. To boost the graphics repertoire, picture libraries available from Unison World's PrintMaster Plus can be used. Graphics can be sized, rotated, and cropped-but not edited.

The program comes on two disks, one with the program and another with additional fonts and an artwork library A single command installs the program in its own subdirectory on a hard disk, or it can be run from a single floppy disk. The program runs in black and white on CGA. EGA and Hercules monochrome monitors, but the on-screen resolution is only the jagged CGA resolution. There's no mouse support, but you can adjust cursor speed.

The hierarchical command structure makes it difficult to get lost in this program. From the main menu you can change your view of a newsletter from wide to zoom, to normal or full width, NewsMaster's main menu branches into one of two paths-Edit or Art; a message bar identifies which path you're in. In addition, duplicate commands, such as changing the page view, are available within each component, so you needn't traipse back to the main menu.

Both the program fonts and graphics are selected from a library-twee list. As you scroll through the libraries, a window in a corner of the screen displays the curtyped text onto the page, choosing from 34 | rent selection. This preview is enormously



Our team can round up some pretty impressive facts and figures for our reports. But even with top-notch writing, the data was getting lost on the page. It seemed words and numbers just weren't enough. We needed an easy way of producing text and combining it with graphs and pictures. The prefect solution was GEM 1st Word Plus. It's an advanced, full-featured word processor that can bring in graphics from other GEM*software programs, like GEM*Graph*. Now take all those facts and figures and turn them into bar graphs, pie charts and maps that really jazz up our data.

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- mouse support
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DIGITAL RESEARCH*

based publishing packages.



Performance Tests: Low-Cost DTP Programs

To see how each of the packages handled different features, we designed a four-page newsletter that forced us to use nearly every command on the menu of each of these packages. For the mid-level packages, we produced all four pages, then reproduced the first page and selected details here. Because the low-level packages were far more limited than their mid-level counterparts, we reproduced just the first page of our newsletter for these products. The newsletter, produced by Aldus Corp.'s PaseMaker (shown below), gives a point of comparison to the more-sophisticated PC-

The newsletter incorporated the following features: - The text for each article was imported from Microsoft Word

(either formatted or saved as a text-only ASCII file). - The graphic "BMI" logo was developed in a draw program:

MacDraw, GEM Draw, or Windows Draw. - The drawing of the building on page I was created in a paint

program: MacPaint, PC Paintbrush, or GEM Paint. - The newsletter incorporates two scanned images: the map on page 2 and the photograph on page 3 (stored as a 300-dot-per-inch high-resolution image file). We used a Microtek scanner and imported the scanned images directly into the page composition program, or saved the files in PC Paintbrush format for the

packages that required it (in this case, Ventura Publisher).

We included a bar chart from Lotus 1-2-3.

- The newsletter mixes one-, two-, and three-column formats. - Text for the lead article jumps from page 1 to page 4. A second article jumps from page 1 to page 3. We typed in the "continued on page x..." line if the program could not provide this automatically.

- The newsletter calls for wrapping text around a graphic in three different ways: On page 1, two-column-wide text changes to one column to accommodate a graphic. On page 2, a graphic falls between two columns of text, forcing each into a half-column wrap. On page 3, the text is intended to wrap along the curved outline of a scan of a man's head.

- Two articles open with initial drop caps.

- The design calls for hairline rules between columns. - The running headers and footers on each page include

graphics (shaded rectangles) and page numbers. - Page 3 includes a table that calls for center-tabbed headings

over decimal-tabbed rows of numbers. - Where possible, we printed the newsletters on an Apple LaserWriter, Because NewsMaster does not support the Laser-Writer, we printed its newsletter on an HP LaserJet.

The BMI logo was drawn in Windows Draw, which has no command for applying a gray screen pattern to the lines of the globe, as required by the original specs. The text in our logo was typed into PageMaker directly, since PageMaker distorts text typed into Windows Draw

The Bylines title was typed The Bylines title was 1,700. directly into PageMaker and manually kerned on-screen.

We used Microsoft Word to format the text font and size. When the file was imported, PageMaker retained all the formattine.

This building was drawn This building was un..... using Publisher's Paintbrush, then imported into and resized in PaseMaker.

We drew the gray bar with a graphics tool on PageMaker's master page. This caused the bar, as well as the footer text, to appear automatically on every page.

Hyphenation is based on the Houghton Mifflin dictionary.

PageMaker automatically creates drop caps.









PAGES 2 & 3

PAGE 4

872

onth

mble when he BMI Employee of e," he said. ertant links

es. Every day he s, transporting s and making sure place.

st two years. He started iving job became available,

now I realize van and w. rain. on't let





Petra Mgmt 24.5 Week 2 15 Week 3 23 23 25 16 Week 4 24 23 16.25

This map is from Click Art Publications, a disk file of predrawn artwork for MarPaint produced by Software Publishing Corp. in Mountain View, Califor-nia. We added the star in MacPaint, transferred the file to the IBM PC, and cropped the image in PageMaker.

Text was wrapped around the scanned image by inserting hard carriage returns at the end of each line. While this effect looks good, it would make editing difficult.

This chart was generated in Lotus 1-2-3 and imported directly into PageMaker.



Performance Tests: Mid-Level DTP Programs







GEM DESKTOP PUBLISHER

The BMI logo was drawn in GEM Draw. The BMI logo was drawn in GEM Draw, which has no command for applying a gray screen pattern to the lines of the globe. The Bylines title was typed in an ASCII text edit and imported into GEM Deaktop Publisher, since the package doesn't allow you to type text in directly.



Bvlines

Bylines

ASHTON-TATE'S BYLINE

e Byline cannot handle a graphic larg than 50K, we could not import the logo. One way around this problem was to capture the e from the screen using the camera program supplied with Byline. Byline uses cerning tables and allows you to edit the tables, but you cannot kern pairs of lette interactively.

PAGEBUILDER

The BMI logo was imported directly as a .PCX file. The maximum typesize that you can type in directly with PageBuilder is 24 points. To create a larger headline, you'd have to create the headline as a graphic (bit-mapped) image expand it in a graphics package, then import the image into PageBuilder.





This image was scanned using a Microtek scanner with EyrSur Plus software and saved in the JMG format, GEM does not support the TIFF format. Text was wrapped around the scanned image by using several text frames having different widths.

To import Lotus 1-2-3. PIC files, GEM Desktop Publisher requires the use of an optional program, The Graphics Link, from PC Quik-Art.



ASHTON-TATE'S BYLINE

Text was wrapped around the graphic using the Byline automatic text wrap feature. The image was broken in two pieces that were less than 50K each. These two halves were imported and then merged into one image on the page.

The chart and figure were imported as a Lotus 1-2-3 .PIC file.







PAGEBUILDER

PageBuilder was able to directly import this scanned image. Text wraps around images automatically.

PageBuilder does not import Lotus 1-2-3. PIC files. To create this chart, we used PageBuilder's built-in charting ability, which lets you enter numbers directly using a spreadsheetlike interface, or import the numbers in .DIF format.

A Number of Reasons A Number

Designed o for the 80386 There's a

revolution taking place in desktop computing. A revolution that's been launched by a square wafer of silicon known as the 80386 microprocessor chip. It puts minicomputer potential at PC users' fingertips. It's a fact that virtually every leading PC manufacturer has built a "box" around this chip. And it's a fact that the "New Operating System" will, supposedly, even run on it. But, it's also a fact that their system wasn't designed for the 80386. Ours is. And it's called PC-MOS/386™

compatible with the millions of

nothing less from the new standard bearer.

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PCs & PS/2s. But we went further, and developed a system which would be fully existing PCs, PC ATs, and PC-compatibles. Power without sacrifice. You'd expect

Thousands of DOS Programs PC-MOS/38674 gives you the best of the past, and the best for your future. Which means that while PC-MOS/386™ totally replaces your old DOS, you won't have to replace the programs you've spent a lot of time learning.

And it all happens so effortlessly. You'll continue to reap the benefits of your favorite DOS programs, while entering a new arena of power.

Think of it! Programs like dBASE III, WordPerfect, Lotus 1-2-3 and Symphony, WordStar, MultiMate...literally thousands of DOS programs-all compatible and multi-user available.

Familiar O. Commands Like DIR and COPY Just as you don't have to learn a whole new array of



have to learn an entirely new set of commands. Instead, the system builds on the knowledge you already have. "COPY" still copies files, and "DIR" still gives you a directory listing. As you might expect, we didn't stop there. There's a wealth of features that have strengthened the commands you know, making them more powerful and easier to use.

 One, Five, Up to Twenty-five Users Jo From the beginning, PC-MOS/386™ was designed as a versatile operating system which

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In a multi-user setting, PC-MOS/386™ uses the computing power of the host PC to drive workstations linked to standard RS-232 ports.

You can choose from a variety of workstations. Mix and match dumb terminals costing under \$500 each with PCs and PS/2s running our terminal emulation

software

All of the bost's resources can be shared. Programs, data, hard disks, tape backup units & printers (including high speed laser printers) are suddenly available to all

users, An 80386-PC has minicomputer potential. With PC-MOS/38678 you can "mini" your micro.



of Users Will Choose PC-MOS/386.

6. Concurrently Supports Virtual 8086 and 80386 32-Bit Mode



80386-based PCs & PS/2s are dual-personality computers. To run DOS programs, they act as PCs with a 640K memory limit. But to take advantage of their minicomputer capacity, they operate in true 80386 mode which lets them address up to four gigabytes of memory. PC-MOS enables the 80386-host and its workstations to independently switch between these modes-making DOS compatibility and 80386 power simultaneously possible.

Multi-Tasking

dBASE While it's true you could look elsewhere for multi-tasking, why would you want to? The other multi-tasking operating system is not now, nor is it planned to be, multi-user. It won't even run multiple DOS applications in multi-tasking mode.

Now consider PC-MOS/386™ At the touch of a key. you can switch between up to 25 different tasks. And if you have workstations connected to a host, they get multi-tasking, too. Finally ... a system that won't hold you back.



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The Price...As you evaluate operating systems, ask yourself if it's reasons you're considering...or rhyme. Ask if you're getting a system for tomorrow, or one that was made for vesterday. See if you're being forced to buy new hardware because of their software. And consider this

Only one operating system in the world can give you the raw power, features, and functionality that you demand. Its name is PC-MOS/386. And it's immediately available in one, five and 25-user versions starting at \$195.

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DEALER INQUIRIES INVITED



Performance Tests: Low-Level DTP Programs







NEWSMASTER

NewsMaster is unable to import graphics from other sources. Instead, you must select a graphic symbol from the program's eclectic city-art libraries. We drew the borders around the headline using NewsMaster's line drawing command and a gray pattern fill. The Byllines headline was typed directly onto the screen in the largest font available—60 points.



Bylines

NEWSROOM PRO

The most appropriate image from Newsroom Pro's clip-art library was the USA map. We used the largest pointbrank available to create the thick black border, then saved it as personal clip art and copied it to the bottom. Using the largest display type (32-point Banner), we typed the headline directly onto the screen and then replicated it.



Bylines Bylines

Bylines Bylines

PFS:FIRST PUBLISHER

The BMI logo is missing from the top of the page since it was created in PICT format (not supported by PFS:First Publisher). The border at the bottom of the bunner is an open rectungle, since no fill patterns are available. The newsletter title is a bit-mapped graphic that has been stretched to T2 points.



NEWSMASTER

We imported text using the program's import ASCII function, then selected News 24 Italic for the title, News 12 Italic for the opening paragraphs, and News 12 for the remainder of the text. The President's Message title was created with the program's Park 12 font.

Since we couldn't import the image of BMFs headquarters, we used an available symbol in the clip-art library. Do you recognize this rendition of the Parthenon? Again, we were unable to caption the photo.

A Message from Our President

This is an exciting time in the history of our company. I hope air of you enjoyed the groundbreaking ceremonies for our new headquarters. When the building is finished, it will be something to

But the business of business continues, and I would like to address a concern that has been mentioned to me by several employees in recent months: the role of BMI in South Africa.

As many of you know. BMI has operated a South African office out



A Message from Our President

This is an exciting time in the history of our company. I hope all of you enhyed the groundbreaking caremonies for our new headquarters. When the building is finished, it will be sceethin. (b) behold.

But the business of business continues and I would like to address a concer. That has been mentioned to me by measal employees in recent wouths the role of EMI in South

as many of you know, BHS has operated a South African office out of Burban since UFG. Ten years later, the situation is South Africa has deteriorated to such a state that every corporation that does business in that transled contains

NEWSROOM PRO

We imported the text using Newtroom Pro's import ASCII function, then selected Sans Serif Small for the type. We were restricted to using a uniform line spacing (either single or double) throughout the document.

Since NewsRoom Pro can't import graphics, we used clip art from the included library, then modified it to create the borders and the caption. We then captured the entire image as a photo. This allowed us to edit the entire 'unit.' We stored the photo en-disk, then inserted it into the column.



This is an exciting time in the history of our company. I hope all of you enjoyed the groudbreaking ceremonies for our new headquarters. When



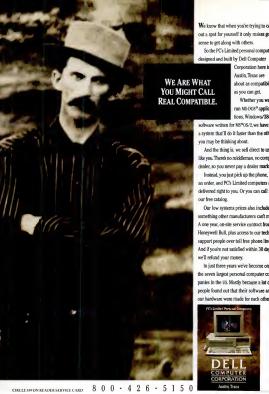
PFS:FIRST PUBLISHER We imported the text as an ASCII file.

The graphic of the building is drawn in bitmapped paint format. The fine lines of the drawing became coarse and jagged, and some details were lost as we scaled the object down from its original full-page size.



BMI's new world headquarters





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In just three years we've become one of the seven largest personal computer companies in the US. Mostly because a lot of people found out that their software and our hardware were made for each other.





NewsMaster does not support a mouse. Instead, you use function keys to invoke the icons listed on the menu at the bottom of the screen.

helpful, although the fonts are not illustrated in true-to-life point size.

And NewsMaster's fonts are only vaguely related to standard commercial fonts. There are two major typefaces available: sans serif and serif. These come in an adequate, albeit incomplete, selection of boldface and italic fonts and in 8-. 10-. 12-.

24-, and 60-point sizes. A potpourn of special custom typefaces with names like Bremen, Cafe, and Twig are also available in a single point size. There's a fancy typeface alphabet avail-

There's a tancy typetace alphabet available in the artwork library, and a Glyph font (undocumented in the manual) that gives the keyboard special symbol attributes. Generally speaking, NewsMaster fonts are amateurish. They appear jagged on both screen and hard conv.

The art component works similarly to the text: you select a graphic by scrolling through the symbol library. Once it is selected, you can move the shaded box representing the graphic around your screen and then "stamp" the graphic into place. You can stretch or shrink the graphic, crop it, and fip in (180 degrees) horizontally or

vertically. Finally, you can wrap the text around the picture.

around the picture.

**MewsMatter does fairfy well with global page composition, but it doesn't score high marks for fine-tuned control. Text flow, word breaks, and line breaks are done with a wish and prayer. The program's lack of hyphenation support means had year are piptally left with advastured line breaks to readjust manually. All of the graphics are bootteed by a box (whether the box is printed or not), so the final does ment has a very "susue" feel, and there is not the picture of the picture of the picture of the picture of the picture.

no way to enter the graphic box and annotate it with text

and want extraction and accountly formated, the second on enveloters; or you'll enjow NewsMaster. But know its limitations, the fonts are limited, the graphics primitive, the laser output shoddy, the page doseaport? NewsMaster's simplicity is like albreath of fresh air, and its results are suitable for less-formal audiences. Although in the corporate word NewsMaster will look like Amateur Hour, it is ideal for the
school or small business.—Robin Raskin

Newsroom Pro

Newsroom Pro is a low-cost (579,95) newsletter-generating program from Springboard Software that uses an analogy of a real working newsroom. You create a headline in the banner area, shoot your artwork in the photo lab, and enter your text at the copy desk. Finally, you assemble the whole shebang in the pressroom. There's even a wire desk to let you comnunicate with other Newsroom users.

But while there's nothing wrong with the program's use of analogy, its use of PC power is another story. Newsroom Pro's limitations are bountiful, and its output is unacceptable for anything more than the school newsletter.

EASY ENTRY Despite the results, the program does provide a simple entry into desktop publishing. Newsroom Prois self-installing and can be run from floopy diske; its documentation is thorough and well organized. The program's commands are icon-driven, with All-key commands are icon-driven, with All-key commands are icon-driven, with All-key commands when the program's commands are icon-driven, with All-key commands when the program is the document. Well are the program in the program is the document, when the program is the document, when the program is the program is the program in the program in the program is the program in the program is the program in the program in the program in the program is the program in the program in the program in the program is the program in t

printer.

Perhaps the most difficult part of the process is file management. A given news-letter contains clip art, personal clip art, banners, and text—all stored as separate files (in subdirectories if specified). Although this strategy does offer some advantage if you freoughtly shuffle parts, it





(415) 848-6670 List Price: \$99.95 Requires: 256K RAM; CGA, EGA or Hercules monochrome monitor; DOS 2.0 or

In Short: A low-cost desknop publisher that can create multicolumn newsletters using both-in. bit-imaged fort and graphes, libera-ies. The program is fully WYSIWYG and the interest contractive commands, though it beds the fine tuning features and high-re-cluster another another with the first bringle features and high-re-cluster another another with the first bringle features and high-re-clusters compute available from high-end desknop publishing programs. Your and results will seem amitteriors. Not corp protected.

NOLE BIG ON READE SERVICE CARD

Switch on a serious surge suppressor.





With test after test proving that 70-90% of all PC malfunctions can be traced to power problems, a surge suppressor is the first accessory you should buy for your PC. But don't put your trust in just any surge suppressor. Get one that gives your whole system

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keep even the largest surges from penetrating into your system. That's why the plus in Master Piece Plus is additional modem surge suppression circuitry to protect your modern from surges,

spikes and noise on the telephone line.

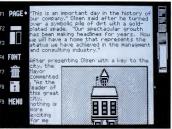
And that's why the circuitry in both models can handle anything an electrical storm or your local power company can offer - up to 6,000 volts with a 3,000 amp follow-on current. (That's the kind of superior performance that passes not only UL* testing, but Cate-gories A and B of the strict IEEE* specification 587-1980 as well.) Now, this may look to you like we're taking more than the

necessary precautions. And actually, we are. But after all, isn't that

what you expect from a serious surge suppressor? Master Piece (\$149.95)

and Master Piece Plus (\$159.95). For more info. or a dealer near you. call (800) 535-4242 In NY (212) 475-5200.





Although Newstoom Pro is a true WYSIWYG program, you cannot see the whole page assembled on your screen at one time.

also makes file management tough.

The program's main menu graphically displays five different "newsroom" scenes, best illustrated during a grand tour of the premises. The first stop is the Photo Lab: here you can choose from 2,000 clipart images that come with the program. To choose an image, you refer to the manual.

five different "newsroom" stillustrated during a grand our isses. The first stop is the Photo you can choose from 2,000 clip-out images can be edited or en-

hanced using the program's built-in graphies tools. You can add a line, a box, a caption, and a pattern fill—and even use the magnifying glass to work with the image on a bit-by-bit basis. To complete a picture, you choose the camera icon, crop your shot, snap the picture, and save it for insertion in the finished document.

select the clip-art page, and call that name

from a list of names in the clip-art library.

insertion in the Insisted occurrent.
Though many clip3-art images are supplied, I was unable to find either a world map or a picture of an office building, which I needed for my newsletter. I tried to falled to modify a hock-air balloon into a globe. Part of my firstantion came from using the primitive magnifying tool—it works with only a very small area at a time, and once you are in magnification mode you can't change your view and work on another area.

TEDIOUS TOOLS The graphics tools are also limited. Newsroom supplies a single screen of tools, including icon selections for five drawing shapes, ten brushes. ten pattern fills, and three fonts (available in either a large or small type size). Using the graphics tools is teldous because you must use the cursor keys to select your cot, in exit the tool menu, and then to draw on the page. To use the graphics tool with the cursor keys is truly and then to draw on the page. To use the graphics with the cursor keys, Freshand drawing with cursor keys is truly a nightmare; in this mouseless environment, I began to feel as if I were in some cursor-pressing purpatory.

Once you edit clip art or create your own, you are urged to save the file as "personal clip art," not as a photo. (Clip art is the only element in Newsroom that can be sized, moved, and flipped.) If you forget this step, as I did, you find you can flip your map of the United States, but the pattern fill you chose remains unchansed.

The Banner area of the program creates the headline, which uses the same clip-art library and the same graphics tools with a few enhancements, such as a larger banner font—but it is only 32 points. Desperately needed is an even larger headline type.

A sojourn to the Copy Room lets you import ASCII text into Newsroom columns or enter other text into the columns. At the Copy Desk you drop your store, photos into their columns and select a banner to attach. You have the option of creating a page layout with or without banners, but you absolutely must have two vertical columns of equal width on a pack.

Documents are restricted to one-page length, so for a multipage newsletten, so for a multipage restricted to using only one large and ensertied of using only one large and ensertied to using only one large and ensemal flont per column. The font choices are Small and Large Serif, Small and Large Saris Serif, and Old English. The small forts are 8 points, large are 16, Finally, you are restricted to using only one line-space setting per column. These restrictions make it tough to create appealing layouts.

The Press Room is where the pieces fit together; you load the newsletter page and print. Both graphics and text are printed as bit-mapped graphics. Laser printers print andly in bit-mapped graphics made with a resolution of 75 dots per inch; judging from the printer drivers available, Newsroom was intended for dot matrix printers. Newsroom Prois scute and easy to use.



List Price: \$79.95

Requires: \$12K RAM, one disk drive, J.NS \$2.1 of tate. In Short: A low-cost publishing program that ascerables a newsletter jata syou would in the real world. by pasting together pretrues, banners, and columns and then going to the prestroom to print. The program has many restructions, and the most serious ones are the number of fonts available and the lack of full-age. W/SIWYG Jayou. Not copy

PC MAGAZINE # APRIL 12, 1988

COREfast Backup Systems The others just don't stack up.

COREJast vs Otner Backup Systems		_						
FLEXIBILITY/SPEED	COREfast	Everex	FastBack	Genoa	Irwin	SY-STOR	SY-TOS	TakeTwo
To evoid learning new programs as your beckup needs change, will this system back up to diskette, herd disk and tape?	YES	NO	NO	NO	NO	YES	YES	NO
Can this diskette besed system beck up 500 spreadsheet files (8.8MB) in 7 minutes and then restore them in less than 6 1/2?	YES	NO	NO	NO	NO	NO	NO	NO
Can this tape based system beck up 1,500 word processing files (30MB) in 7 minutes and then restore them in less than 12?	YES	NO	NO	NO	NO	NO	NO	NO
FUNCTION								
Will this system automatically perform up to 8 pre-scheduled backups per day?	YES	YES	NO	NO	YES	NO	YES	NO
Will you be able to save your entire disk without having to select and back up single files at a time?	YES	YES	NO	YES	NO	NO	YES	NO
Does this system conten file-management feetures which ellow you to copy, re-name, view end delete files before becking up?	YES	NO	NO	NO	NO	NO	NO	YES
Will this system seve twice es much dete per diskette or reduce your beckup time through the use of date compression?	YES	NO	YES	NO	NO	NO	NO	NO

"COREfast offers more flexibility, and therefore more value, than FastBack." —InfoWorld "an unbeatable combination of virtues: speed, versatility and reliability. -PC Magazine

CIRCLE 225 ON READER SERVICE CARD





Microsoft Windows as a Desktop Publisher

Text, graphics, and fonts are the three key topop publishing packages reviewed here. So, theoretically, if you have Windows, with its Windows Write and Windows Pains and the included printer drivers, you should have all the tools you need to do deskiop publishing. We decided to try it out.

Here are some tips for trying it yourself. As for the results that you can expect—the ones shown here soeak for themselves.

• Oraphics and text are the stuff desktop publishing is made of, and Windows has a different program for each. Windows Wrise can accept ext from Wrise Each, however, is handicapped. Integration is achieved by cutting the elements from one domain and pusting them into

Write accepts a graphic from Pains and passes into the sext document, but hen it cannot wrap the text around the pasted graphic. Write was out of the question as the dominant partner. Pains's fewer limitations make it the lesser of the two evils. If you format your text in Write and paste the text into Pains', Pains accepts the Ext.—only it was the own current settings to format. The trick is to make sure that you properly set prains' of default settings.

Faint is handicapped because it has a "most common denominator" mentally, divergarding the clear high-resolution text display Write can produce on a Pattern for control of the Pattern for th

So, while you can wrap text around graphics, the text is very difficult to read. In this fundamental trade-off, using Paint is the winning solution because it handles both text and graphics graphically.

 Creating the graphics first allows you to design your page more accurately. The text can be pasted to flow around the predefined graphic spaces.

 Paint has no on-screen ruler lines, so you'll need to cultivate a good eye. There's also no



interline spacing control. If you want doublespaced text, you need to press Return and insert a blank line.

 Save to disk each time you create a new element on the page, even if you'd rather not.
 That way, a single faux pas won't destroy hours of work.

 The mouse is a gross tool. Trying to fit a circle neatly inside a square is like trying to stuff a software program back into its shrink wrap.
 Use a large white space somewhere in your document to create your graphic and then move the graphic into place within its borders. If the fit isn't right, just use UNDO and head back to the drawing board.

 Because the mouse is a gross tool, you'll be doggoned if you try to get lines on a drawing to match up exactly. Use Fat Bits for the final tuning. Fat Bits let you edit pixel by pixel so that, for instance, you could make lines meet exactly. Using Paint, the borders were easily produced by creating a rectangle and filling it with a pattern fill. The rectangle could be copied and pasted to other locations.

Pollmer. Palor's maximum Times Roman point size in 64 points; spect called for a headline that is 127 points. To get around the limitation, we created a stylined headline by copyring and pasting the word Byliner into an attractive pattern and using the fill command to give a shaded gradation to the headline. Notice how jugged the large fonst appears. Even when outputted to the Apple LaserWriter, it can only achieve 75-60-op-rinch resolution.

The world outline was drawn using the oval draw function. It was drawn in a large blank area and then moved into the Paint-created

require.

The longitudinals were created by copying the world outlier to a large working space and then rearring just enough of the outlier to display two longitudinals that would fit cornectly inside the world. A second set of longitudinals was cereated by crasing even more of the eriginal ovan. Once and pasted imp place inside the oval. (Additional longitudinals were simply too difficult to place correctly.) The lattice lines were drawn with simple line drawing. The resulting logo is highly sylfand.

Better Management Inc." was manually entered using the 6-point Times Roman font included with Windows Paint. Paint has a good selection of fonts and typesizes. However, the words are difficult to rend and look more like hieroglybylics than a logo.

The specifications called for two columns of unequal width on the page. This was achieved manually by drawing a vertical line twothirds of the way across the page. Again, however, knows nothing about wrapping text to fit within a column. To get the correct columns width for the text, we measured the width of the columns and cotent and the column and the column and column and column. The page of the text into Mivit's a margina. Finally we cut and pasted the text into Paine; is fit exactly into the column.

We were unable to control the vertical spacing of the text. This increment is determined by Paint and is based on the selected fort size. Paint also has no hyphenation or widow and orphan controls. However, its rich assortment of fonts made it easy to size the text according to our

specifications.

e then imported the text into Write's margins, hally we cut and pasted the text into Paint; it fit actly into the column. We were unable to control the vertical spacing the text. This increment is determined by Paint of Is based on the selected front size. Paint also

The BMI world headquarters rendering lets Patar really show its staff. While graphic images cannot be imported into Palar (unless your application saves in Paint formas), it wasn't difficult to recreate the graphic using Paint's drawing tools. Notice that the resolution of the graphic is much higher than that of the text.

The footer was also created manually with a pattern-filled rectangle and 6-point type for the copyright notice. Again, there's a discrepancy between the quality of graphic and text output.

The couput to the laster primiter is 300 dps, and Pauler's papilic ability is well reflected in the illustration. What can't be seen if the 20-ded minners of waining finer it took for Windows to spool and then transmit the image to Windows to spool and then transmit the image to the contract of the co

Bill O'Brien is a PC Labs project leader. Robin Raskin is a frequent contributor to PC Magazine.

same task requires upwards of 6 minutes.)

Bill O'Brien and Robin Raskin



Microsoft Corp

16011 NE 36th Way
Box 97017
Redmond, WA 98073-9717
(206) 882-8880
List Price: 599
Requires: 512X RAM, two disk drives,
DOS 2.0 or later.
In Short: An operating environment that
allows PC users to create a Mac-Risk infec

face for their application programs. Windows comes bundled with two applications, Windows Write and Windows Paint. Together they provide a low-cost desktop publishing environment for those who aren't particular about the quality of text output. Not copy proceeded.

CIRCLE SATION READER SERVICE CARD

but I have trouble with the electronic pressroom analogy. I thought the ability to see a mock-up of a newsletter on-screen was one of the driving forces behind desktop publishing, yet Newsroom Pro treats the individual newsletter components as separate entities. The program can best serve in a high-school journalism class, or as a jump-off point to other, more-sophisticated programs.—Robbin Raskin

PFS:First Publisher

PFS.First Publisher, \$99 from Software Publishing Corp., is a low-end page layout package that offers simple page layout capabilities, a modest variety of fonts, and bit-mapped graphics on a WYSIWYG screen. Its interface uses drop-down menus and icons representing graphics tools.

First released in April 1986 under the name PFS.ClickArt First Publisher, the new release offers a number of new features and improves on the original's implementation of basic operations.

QUICK AND EASY Two of the program's biggest strengths are its short learning curve and ease of use. Once text and graphics files were prepared, we assembled our one-page newsletter within 3 hours. This quick execution is a result of the simple menu commands and the rela-



(415) 962-9910. List Prices 599 Requires: 512K RAM, two disk drives, graphics card, DOS 2.0 or later. In Shart: An easy-to-use package most appropriate for short newsletters. It offers limited typographic features—some leading but no learning or automatic hyphomistion—and you cannot set tabs. Not copy protected. CRECA 899 00:1800:1839002.0900.



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ton Instrument, SCAN-CAD, and DM/PL are





PFS:First Publisher is the only low-level desktop publishing program reviewed here that supports a mouse and pull-down menus.

tively limited features compared with higher-end programs.

Beside packages like PageMaker and Ventura Publisher, however, First Publisher's page layout process is slow and awkward—it took 15 minutes to print our newsletter on an Apple LaserWriter Plus. For these reasons, First Publisher is most appropriate for short newsletters, flyers, display ads, and overhead transparencies.

First Publisher offers a WYSIWYG work screen that shows a portion of the printed page. Although you can view the full page as a miniature of about one-fourth the screen size, you cannot edit in that

view. Most commands are listed under seven pull-down menus across the top of the sevene, executed through a mouse of the keyboard. Trying out different commands, in fact, is a good way to learn the program; the manual is clear as well. A mouse is optional, but we found it more conventional has keyboard equivalents for certain functions, such as selecting graphics—although we come withfach to keyboard although we some withfach to keyboard although we some of the most commonly indeed pures.

First Publisher allows you to input text discovery or import ASCII or text files from matted using PFS: Write, PFS: Professional Write, or PFS: First Choice. All imported text is initially formatted in the currently selected forn, but First Publisher retains style information from supported packages if those styles are available with the currently selected forn.

You select the default font for all typed and imported text and then select parts of text to change fonts for headings and captions. Once you've selected the text, you use menus to change typeface, type size, and style of type, or to Cut, Copy, and Paste text through the Clipboard.

The Font menu lists the fonts you moved onto PES-First Publisher's MAS-TER.FNT file. You can load fonts from any First Publisher Letters package, as well as Macintosh fonts telecommunicated from the Mae to the PC, and you can due to 14 fonts on the menu at one time. The series and styles available will vary depending on the font selected, but the range of possibilities includes nine sizes (between road and the points) and four styles froman, budding, talki, and four styles froman, budding, talki, and four styles froman, You can adjust the leading (spacing between lines) to some extent. There is no keming or automate hyphenation feature, and you cannot set tabs. You cannot set more than a page of fext at a time, and editing text crossing several pages is slow since text does not automatically toll forward from subsequent pages after deletions. To draw utel fines, rectangles, and

Two of PFS:First Publisher's biggest strengths are its short learning curve and ease of use. We assembled our one-page newsletter within 3 hours.

freehand drawings, you can use PFS:First Publisher's built-in graphics tools. No fill patterns, however, are available for the rectangle tool. Ruled lines and rectangles can have one of four different line thicknesses.

In addition to the graphics tools, you can import graphics files from four sources. First, you can create bit-mapped files using a paint program. Another method is to create separate .ART files by exporting graphics that you created with First Publisher's built-in graphics tools. Third, you can use First Publisher's Snapshot utility to make screen dumps from any application on the PC, then use a utility called Snap2Art to crop and size the image. Finally, you can buy libraries, or Image Portfolios, of graphics images distributed by Software Publishing Corp. (This company started as T-Maker, whose first products were First Publisher libraries for the Macintosh.)

Once on the page, you can select all or part of a graphic and scale it, duplicate it, flip it horizontally or vertically, invert it (reverse black-and-white pixels), or save it as part of your library. You can also Cut, Copy, and Paste graphics through the Clipboard and magnify portions of the graphic tor modify it pixel by oxisel.

For page makeup, you define basic parameters for each page through the Define



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GEM Desktop Publisher

None of the \$100-to-\$500 packages reviewed here can produce output that matches the quality of that created with high-end packages such as PageMaker or Ventura Publisher Since by definition desktop publishing is all about producing quality output, it would be best to stick with

the high-end packages. Of the packages reviewed here, your choices are Byline (\$295) or GEM Desktop Publisher (\$395). Both are limited in the features they offer (for instance, neither has automatic hyphenation), but they are easy to learn. You'll want Byline if you're mostly text-oriented and want to add occasional graphics-or if you want the best possible way to format your dBASE files. Choose GEM Desktop Publisher if you lean more toward graphics, particularly those based on the

GEM environment. Although NewsMaster, Newsroom Pro. and PFS:First Publisher are priced right (all around \$100). you won't be satisfied with their jaggy output. If you must have one, take PFS:First Publisher, which has the best graphics import and the greatest number of features for manipulating type.

Page command, including page margins, number of columns of text (up to four), gutter width between columns, leading, and paragraph alignment (left, right, centered, justified). Once text is on the page, you can vary these settings for all or part of the text using the Baselines feature, which also lets you adjust the spacing between lines of text by entering a numeric value in points.

You can adjust the spacing between lines individually by dragging each line of text up or down. One feature of these com-

mands, sometimes convenient but otherwise bothersome, is that you can't select a small group of lines to be changed; you are always adjusting a whole column, or every line above or below a selected point in a column, or one line at a time. You can't easily mix different numbers of columns on one page. Creating formats with mixed column settings on each page is only slightly inconvenient to set up initially, but it becomes a significant irritation if you need to edit the articles very much after they are arranged on the page.

JUMP AND FILL You can jump an article from one page to another as you are working, or you can fill one page and leave continuation text in an invisible "overflow area" for that page, returning to pick it up when you later find the right position for it. If you leave two unfinished articles on one page, they will be "stacked" in the overflow area (additional pages of the publication) in the same sequence they appear on the page-you will need to cut and paste some text if the two articles do not jump to the same page later in the newsletter.

One of the program's most practical features, shared by few other packages in this price range, is the PictureWrap command: you can position a graphic on top of text in a column, then invoke the Picture-Wrap command to make text automatically reformat, changing the width of the lines that fall alongside the graphic to wrap around it

You can print horizontally on an 81/2 by I I-inch page, but you cannot design pages to print sideways or on larger sheets of paper. There is no automatic page numbering facility, nor can you set up running headers and footers. (The manual recommends that you store headers and footers as text or graphics files and place them on each page as you come to it; text created as a graphic, however, is printed as a low-resolution bitmapped font.)

As a starter package, PFS:First Publisher offers a good value for the price, though heavy users are likely to grow out of this package rather quickly. It may prove to be a good interim solution for those who want to try out desktop publishing on a small scale before they trade in their PCs for ATs with a higher-end package.-Diane Burns and S. Venit



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How to pick th



Though most mice out there look pretty much alike, they're not all equal in performance. It pays to be just a little choosy to make sure you end up with the right mouse for your needs. Starting with software. If you want full com-

starting with software. If you want tuil compatibility with all of your software, all you have to do is look for a mouse with the Logitech name. There are four in all, each one designed for different hardware needs.

THE HIREZ MOUSE

If you've got your eyes on a high-resolution screen, the mouse to get your hand on is the new LOGITECH HIREZ

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Good instincts run in this family (left to right): the new LOGITECH HIREZ, Mouse (\$179), the only mouse designed opperaly for high-res screen; the LOGITECH Series 2 Mouse for the IBM PS/2 (\$99, Plugs right into mouse port); and the LOGITECH Mouse for standard screens (\$119, in box and serial versions).

LIGHTECH Mouse for standard servers (\$119, in bus and serial versions).

All come unth Logitech's own Plus Software, which assures ease of use with
vertually any software, mouse-based or not.

effort: mouse maneuvers that used to require sweeps of the hand are now reduced to a flick of the wrist. Which makes this new mouse a hand's best

friend. And a more reliable, long-lasting companion. And, like all Logitech mice, it's fully compatible with all popular software, and equipped with a Lifetime Guarantee.

THE SERIES 2

MOUSE

For those who've chosen the Personal System/2," the most logical choice is the LOGITECH Series 2 Mouse. It's 100% compatible with PS/2, and plugs right into the mouse port, leaving the serial port free to accommodate other peripherals.

e right mouse.

THE ALL-PURPOSE MOUSE: SERIAL OR BUS

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The three mice pictured to the left come with all this expertise built right in. Which explains







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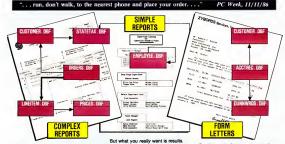
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ommencing in the issue of June 12, 1984, Project Database launched the PC Magazine tradition of presenting special reports on whole classes of software. Our first blockbuster reviewed 66 database packages and sprawled over seven consecutive issues.

Those issues were a milestone; no one had ever attempted such a large scale comparison of competing computer products. Few though we'd try it again soon; that kind of coverage is costly. But blockbuster issues quickly became among the most popular with PC Magazine readers and now include other categories of software, as well as the annual roundup of printers. You can track the errowth and diversity

of the PC business through these blockbusters, which also reveal the phenomenal increase in product sophistication. Four years later, our 1988 version, Pro-

Four years later, our 1988 version, Project Database 3, has grown to comprise 77 programs divided into three categories. In The June 12, 1984, issue saw the inauguration of Project Database, PC

Magazine's first
"blockbuster." Here we
revisit the genre,
reviewing 77
databases in this

and the next two issues.

this issue you'll find 24 products in the simplest category, "flat-file managers." The next two issues will cover 9 relational database programs and 44 programmable relational database products.

For many, database programs are still enigmas. Over this and the next two issues, we hope to put that enigmatic reputation to rest. From files, records, and fields to relational versus network and hierarchical database models, it's all here.

Thousands of hours of testing these products according to the most rigorous testing script ever devised by PC Labs has produced the most comprehensive series of database software reviews we've ever published. The introduction to each group of products explains how they work, whom they're for, how to get the most out of them, and, must important, which one? 8.

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EASY-TO-USE SOPHISTICATES

A ccording to the market researchers, word processors and spreadsheets lead the list of the most popular PC applications. Database managers come in a distinct third.

Which is a bit odd, because if we measure by reach and impact, the contributions of database management system (DBMS) packages go far beyond the individual, personal-productivity gains of word processing and spreadsheets. Database functions and benefits reach across whole organizations and range from keeping mailing lists to keeping the books. Thus Protect Database 3.

Intus Project Database 3. In the following pages, you'll find reviews of 24 so-called flat-file database programs. In the following two issues (April 26 and May 17), we'll take a look at approximately 53 more database programs that have been drawn from the ranks of relational DBMS packages and programma-ble relational backages.

Flat-file databases, which use data from only one file at a time, are no longer the feature-

poor little cousins of powerful relational DBMS packages. The best of today's flat-files are easy to use and have enough sophisticated features to make them

features to make then all you might ever need in a database. ELECTRONIC SHOEBOXES? In the early days of the IBM PC, the rewards of computerized databases were often misrepresented by vendors, who likened a DBMS program to an "electronic shoebox." IBM even referred to simple DBMS programs as "electronic filing."

The pitch was simple; just toss all your records into this magical shoebox, shake it a couple of times, then open the lid a bit and watch your information pour out in a nice, orderly way, revealing connections and relationships that you never dreamed existed.

Woe betide the innocent who believed the pitch and bought one of the packages, thinking it would somehow, almost mystically, bring order to that bulging fourdrawer file cabinet lurking in the corner.

The essence of most database managers is structure, and today the need to define the structure of the material to be "filed" in the database—and to enter material ac-

DATABASE TRICKS AND TRAPS

How you set up a database often shapes how useful that database will be. If you're a newcomer to PC database systems-and even if you're an oldtimer looking for new tricks-here are some tips to help you design a database that will be easy to work with and also capable of giving you back the kind of information you need in the form that you expect.

■ When setting up the input screens for the database (a process often called 'painting' the screen layouts), think about the kind of logical processes those who'll enter data will go through.

It's a lot easier to enter "Mr.." then "John," then "Doe," for example, than "Mr.." "Doe," "John." Your database program will give you back data in whatever sequence you wish, so even if you expect to use last names first in reports from that database, follow a more natural style for data entry.

■ Don't be afraid to put more than one item on a line in input screens.

Partly because of the limitations of some early flat-file products, partly because it's marginally quicker and easier. a lot of PC DBMS users have fallen into the habit of using one line per item, resulting in ugly, space-wasteful screens with a field name at the beginning of each line, followed by a single item.

Combine related items on a line (for example, CITY, STATE, ZIP), but in separate fields, so that you get more data

onto a single screen, in a more logical ■ Leave more than enough space for

each field.

Though today's flat-file DBMSs are easier to restructure than earlier products, redoing your database to put a few more spaces in a field is still agony. Anticipate how long entries may be, then add a few spaces. Remember, for example, that ZIP+4 codes require ten spaces, not the

five spaces of current ZIPs. ■ Break data out into many small fields.

Separate a street address into at least two address-line fields ("Suite 4C, Big Huge Corporate Center," and "44327 Hillsdale Parkway"), and always senarate city, state, and ZIP fields. (Consider whether you need a "country" field. too.)

Failing to separate cities, states, and ZIPs will almost certainly defeat your later efforts to sort and select records from the database

■ Add fields now that you may not need till later.

Allow at least two separate telephonenumber fields, for example, even though few of the records in the file may have a second number at the outset. And conside er adding additional fields for FAX numbers. Telex numbers, and electronic-mail addresses, even though you won't use those fields immediately in most of your entries.

Add a "notes" field.

Even though most DBMS programs won't let you sort or select based on freeform text entries in a notes field, it's helpful to have a place to store related notes with your data. In a database of potential contributors to your nonprofit group, for example, a notes field might have entries such as "big giver but likes to be romanced," "prefers to give through family foundation," or even "tightwad, but he's Jerry's uncle, so let him handle this one."

■ Use white space in screen layouts. Leave an occasional blank line on-

screen (or draw a line or box, if your program permits) to separate related blocks of material.

Use succinct field names.

Save space and make your life easier by using clear but brief abbreviations for field names: FNAME, MI, and LNAME for first name, middle initial, and last name, for example, And remember that field names must

be unique, so use something like ADDR1 and ADDR2 for the two streetaddress lines in a name-and-address record.

 Consider a "last updated" field. If your database will frequently be up-

dated-and especially if the currency of the information in it is important in your use of that data-consider adding a LASTUP field for the date on which the data in the record has most recently been modified.

cording to that structure-is better understood by PC users and more fairly represented by vendors.

While the days of the electronic shoebox analogy are over, today's best flatfile DBMS programs show that it really can be easy to store and retrieve data with a PC. Flat-file database programs have grown markedly in sophistication and power over the past 2 years; the best of them haven't lost the ease-of-use touch in that process

Incidentally, one category of database products does approach the shoebox model, allowing users to ignore questions of structure when entering information and to retrieve that data with some ex post facto structure applied. These programs-often called text-oriented databases or textbased management systems (TBMSs)are not included here but have been covered exhaustively in "TBMS: Database Power Unleashed " PC Magazine November 25, 1986.

SIMPLE, NOT STUPID Flat-file DBMS products have traditionally gotten little respect from PC gurus, though they're by far the most widely used and perhaps the most widely useful database programs extant.

In the early days of the IBM PC, flatfile database managers were exemplified by PFS:File and PC-File. The former. ported to the PC from Software Publishing's hit program on Apple IIs, became an early standard, especially for relatively simple, personal-scale record-keeping. (Indeed, the letters "PFS" in the names of Software Publishing's five lead products come from "personal filing system," a fair description of the early versions.)

■ Think about subtleties in name entries.

In a names-and-addresses database, how will you handle live-togethers? If John Smith and Mary Doe choose to live together, and you send them a sales pitch addressed to "Mr. and Mrs. John Smith," Mary's not likely to become one of your biggest customers.

And if you're going to be mail-merging your way through stacks of fake personalized letters to your clients, you'll probably want "Mr. Philip Glastonbury" in the inside formal address and on the envelope. But what if everyone who knows him well-certainly including vou-calls Phil "Porky"? Won't vou want to begin those letters with a "Dear Porky" salutation?

Consider adding a NAMECALL field for the form of address that people listed in the database prefer in informal contacte

■ Build a tiny test database, then design and run your most important reports before adding more entries.

This may be the most important piece of advice I can give. It's heartbreaking to design a database, enter a few hundred or a few thousand records, sit down with a satisfied smile and design that first report format-only to discover that you should have broken out one of the fields into two or more fields to get the report you need.

Design your input screens, enter some records to build a tiny test database, then

PC-File, which along with PC-Talk was one of the two biggest hits among early IBM PC shareware, offered more features and a lower price-for as little as \$00.00, if you chose not to register your copy and make the voluntary contribution. Its author, Jim Button ("a nom de code" adopted by a former IBM programmer who spent his nights writing software at home for himself and his friends), has built a tidy company, ButtonWare, around PC-File and its successors.

Perhaps because those two programs had relatively modest capabilities and very write and actually run your most important reports before you start data entry on a large scale. I can almost guarantee the process will identify structural changes you'll want to make in the database before filling it up.

- Consider hiding a fake record or two
- in the database. But make that fake record easy for you to find.

If your database has any conceivable commercial use-not only by a competitor who'd like to see your client list, but by someone in another field who might find value in mailing those clients a sales pitch-put a couple of fake entries in the database. Use phony or obscure names but real addresses. You might use your mother's name with your address, or maybe "George K. Hennepin" with your mother's address. Then if the database should someday stray and is used by someone else, you'll have concrete evidence of their actions when the envelope addressed to that nice but imaginary Mr. Hennepin arrives in your mother's mail-

That's how the big-time mailing-list vendors protect their lists, which are not sold outright but only rented. Those lists are full of phony names, designed to provide evidence of misuse of the lists.

Just make sure you remember which entries are real and which phony, lest you or an employee waste time and money trying to reach these hide-in-plain-sight secret agents .- Jim Seymour

simple interfaces, flat-file database management software programs became associated in many PC users' minds with words like "simple" and "limited"-as in "too simple and too limited for my purposes." The simultaneous rise of a marginally relational database program written by Wayne Ratliff and called Vulcan-later renamed dBASE by a clever marketer. Hall Lashlee-fueled the prevalent view that flat-file programs weren't serious products, and certainly weren't capable of serious work

Bosh

SIMPLE, NOT SIMPLISTIC While well-designed flat-file products are simple to learn, simple to use, and unarguably limited in their capabilities, the real issue is whether they have what it takes to handle your data management needs. For a very large percentage of PC users, the answer to that question is yes.

Let's dispense with the grandeur surrounding the term relational database and the implicit put-down of the phrase flat-file manager. The only fundamental difference between the two is whether they can draw records from more than one file at a time. Which does not imply a "more is better" equation.

By separating data into several files, then linking those files through one or more shared relations-data common to all the files-relational DBMS programs make it possible to construct big, sophisticated data-management systems. In an accounting system, for example, we might have customer information in one file, vendor information in another, inventory data in a third, and our accounts receivable, accounts payable, and general ledgers in still others.

Suppose, for example, the clerk at the PC that's used as a point-of-sale terminal at XYZ Auto Parts rings up a sale of a muffler to Ms. Jones. Based only on his input of her name and the part number, the database system could print on the invoice her full name, address, and account number, look up in the inventory record the description and current price of the muffler and print that on the invoice, add the sale to her account in accounts receivable, post the transaction to the general ledger, even reduce the number of those mufflers in stock in the inventory records, then check to see whether a minimum desirable inventory level had been violated-and if so, churn out an automatic order to the shop's muffler supplier. Whew

Sounds impressive. And it can be. It also sounds tough to build such a system. And it can be. To the point where wrestling with a relational DBMS program for the kind of list-keeping functions many of us handle on our PCs becomes a particularly perverse kind of overkill.

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1-2-3 AS A DATABASE

The ubiquitous Lotus 1-2-3 doesn't really add up as a database program, but many users prefer working around its limitations to switching.

Ome readers may be surprised when they don't find Lone 1-2-3 reviewed as a flast-flie database program in this issue. Roughly 3 million people use 1-2-3—more than any other microcomputer application program—and, while 1-2-3 is primarily an electronic spreadsheet, it also serves as the only database manager many of its owners use.

Obviously, for some people the reason is economic. Why buy another database program when you already own one that can do the job? Others simply prefer to use a tool they're comfortable with, even to handle tasks for which it's less appropriate. And though 1-2-3's database feature is best suited for simple listkeeping, that's all many users will ever need a database for.

Not only that, Lotus's market dominance has spawned a host of add-in products that spiff up 1-2-3's data entry, manipulation, and reporting capabilities. Some of these products, which run using 1-2-3's Add-In Manager, come from Lotus itself, namely Report Writer and HAL. Others include @BASE from Personics, D.A.V.E. from Goldata, Data Manager from Intex Solutions. DB 1-2-III from Triple C Software, Deia from PC Publishing, Informix Datasheet Add-In from Informix Software, and the soon-to-be-released Silverado from Computer Associates. (For more information, see "Living with Lotus," PC Magazine, January 26, 1988.)

THE SPREADSHEET AS DBMS How do you use 1-2-3 itself as a database? Basically, 1-2-3 works with columns and rows of data, which make up ranges. When you use the program as a database, the top row in a range includes the field names as column headers. Each successive row in the range is a record, each column is a field, and a given cell is a field within one record. Unlike a typical database, however, 1-2-3 is table- rather than record-oriented. This means you have to move your cursor manually to the next field or record when entering data. In addition, if the columns extend beyond the right-hand boundary of the screen, you won't be able to see all of the data for any given record at one time.

Setting field types is simple in 1-2-3 with the /Range Format command. You can set value, text, date, fine, and logical field types. Using 1-2-3 macros, you can ground this issue's database features table. To set field length, you simply adjust column width.

1-2-3 requires that the entire database be in memory at one time when you're using it. Large spreadsheet files can take advantage of expanded memory that the herest to the LIM standard, but 1-2-3 still limits you to 8,191 records (the maxinum number of rows in a 1-2-3 database if one row is used for the column/field headers).

The most commonly used 1-2-3 data-

base function is Data Sort. This allows you to sort a specified range of records in order by one or two fields, with primary and secondary sort fields, each of which can be sorted in ascending or descending order.

You use 1-2-3's Data Query commands to search for each instance of a given set of field conditions, to copy selected records to a different part of the spreadsheet, and to delete selected records. Though these functions are powerful, their use can be confusing.

To use the full set of Data Query func-



Lotus Development Corp. 55 Cambridge Pkwy. Cambridge, MA 02142 (617) 577-8500 List Price: \$495

Requires: 256K RAM, two disk drives (hard disk recommended), DOS 2.0 or later.

In Short: If you don't need to store more than 8,191 records and you have enough RAM for the entire file to fit in memory, 1-23 will work for you as a database. However, data entry can be awkward without programming, and report design in also limited. But a number of programs are variable to spiff up 1-23's performance as a database. Copy protected. GREC_EMM_CRECE_REPORTED_CRECE_REPORTED.

of the sort important to XYZ Auto Parts would be difficult or impossible—and the result hopelessly clumsy—with a flat-fliely manager. Dust drew would be a flat-fliely manager. Dust drew with a flat-fliely manager. The state of prospersion of computer equipment used in your office, or an in-house telephone directory—each of which could be handled very nicely with the information in a since fliel. Lists such

as those have become classic flat-file DBMS applications.

DATA CHECKING Until recently, there has been one valid reason why savvy database users might prefer the high-end relational programs over flat-file products, even when dealing with just one file at a time. Apart from their capacity to collect data from multiple files, relational pack-

ages were a lot more sophisticated in how they accepted that data.

For example, users of the big-name relational packages can assign certain characteristics to a field. In the space for a Social Security number, for example, the person setting up the database can make that a required field—one that must be completed before the record can be filed away by the person handline data entry. tions, you have to define three ranges in the spreadsheet: input range, criterion range, and output range. Each range must include column header names identical to those in the input range.

The Input range is part or all of the database that includes the original rough is where you specify. The criterion range is where you specify the conditions for finding, copying (called extracting), or deleting records. You can use multiple criteria in successive rows or in other columns to set up AND and OR criteria conditions. AND and OR criteria conditions and lower-right cell coordinates, the area in the spreadsheet where the result of the data outer's dissulved.

You can have any kind of report you want with I-2-3—just so long as you like your data arranged in columns. Though you can set up custom report formats with I-2-3, the effort required is much greater than that for most true database programs.

1-2-3's STRENGTHS The good news is that because 1-2-3 is a spreadsheet, its mathematical, financial, statistical, logical, and lookup functions go far beyond those of most database programs of all categories.

1-2-3's macro capabilities are a second important consideration. You can program 1-2-3 to perform automatically any operation that you can do manually using individual keystrokes. The pro-

And he can specify formatting characteris-

tics for the field, such as all-numeric (on

the assumption that an alpha character

must be a typo) and a defined format, such

as three digits, a hyphen, two digits, a hy-

phen, then four digits.

gram also has a macro command language for controlling the screen, developing user menus, allowing keyboard input, manipulating data, and working with files. We were able to perform all the tests

We were able to perform all the tests in the database testing script with 1-2-3 as our database. Most operations required multiple steps, but that's true with many database programs as well. The best way to handle a complex yet routine data manipulation is to write a macro to take care of it for you.

As long as you don't need to store more than 8,191 records and you have enough RAM for the entire file to fit in memory, 1-2-3 will work for you; but data entry can be awkward without programming, and report design is also limited. If, after trying a Lotus or third-party did-in, you still need more capability, there's one last resort: convert 1-2-3 data.

You can use Louis's Fix Translation Utility to convert 1-2-3 worksheets or ranges directly to BBASE II. dBASE III. dBASE III

PAINLESS REPORT WRITING The real story of the development and growth of flat-file managers over the past 2 years has been the combination of that kind of data-handling intelligence with the case of data-handling intelligence with the case of more-sophisticated relational DBMS programs are now quick and easy with flat-file managers; new users may not even be

aware of how difficult they once were.

Report writing is one example. That's the clumsy term used to describe getting answers out of the database. While these "reports" may be sent only to the screen for quick ad hoe inquiries or saved to disk for later editing, most report-writing efforts are aimed at producing printouts.

Report writing with flat-file managers has generally been easier than with relational products, but often not *much* easier.

Getting what you want, sorted and formatted the way you want it, with page titles and column headings and headers and footers and page breaks and the rest of it in place, has required repeated test runs, each more time-consuming and frustrating than the one before. Too often, users have accepted something less than what they really wanted and perhaps needed because they were fed up after 10 or 20 attempts and had to get on to other work.

MANIPUATING 12-3 An important sep in developing easy report writing for flat-file imanagers was the appearance of 12-3 Report Water (developed and first published by Concentric Information Proceedings of the Proceedings of

Report Writer answered that need by making the job of defining reports easy. Users can simply drag elements, such as names and addresses, into place on the screen. When the screen looks right, they tell Report Writer to make a printout that looks like the screen—and they're

through.

Some of that approach is now evident in the report-writing facilities of the better flut-file managers. Ashton-Taté's Rogald-Pile, for example, makes it easy to create both quick-and-dirpt "quick reports" made more elaborate, heighly formatted "autom reports." Best of all, it allows users to take a" snapshot" of a report design, including the data-retrieval specifications in place, for later reuse. That kind of easy creation and even easier reuse of report formats

That kind of data verification and data typing has now moved down to many of the better flat-file products—evidence of just how seriously users take them.

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matches users' needs and the repetitive nature of so much database work: monthly inventory printouts, price lists, telephone lists, and so forth.

In the same vein, some vendors are also supplying sets of report templates with their flat-file managers, such as automatic three-, four-, and five-up mailing-label format files.

BETTER USER INTERFACES Ofter index of sophistication are appearing in flat-file products. Software Publishing, or cample, buried the simple but ugly and limited PFS-File interface when introducing PFS-File interface when introducing PFS-File interface when introducing PFS-File interface when introducing PFS-File interface is upon the angle of the interface is upon the producing producing in fact, that Software Philing has extended it to the whole Professional Plata, and even up to their help of the producing PfIle in the producing produc

Ashton-Tate has also paid attention to the user interface in RupidFile. Intended for the user with relatively sophisticated data-management needs within the context of flat-file structures, RapidFile was the first "chameleon interface" program on the market

the inductive of Applied Title has its own attactive and functional "look," featuring pull-down menus terminiscent of the Macincols or of Ashton Tale's own Francework. But if you're a Lotte 1-2-3 user unorsight menus across the top of the sereen, beatson and the series of a moving-her control to the depth of the series of the series of the local deathbase life, then hit CIL-Sakshash, and Republic the happily converts is: pull-down menu interface to a Lotto-like display with horizontal menus across the top of the series.

How do you access those menus? By hitting the Backslash key, of course—just as you would in familiar, comfortable 1-2-3. (RapidFile users also have the option of using the Program Settings menu to change permanently to a Lotus-style moving-bar menu.)

HAL, ARE YOU THERE? Another kind of sophistication is evident in Symantec's Q&A. Combining a superb flat-file manager with a full-function word processor

was a good start. But Symantee also added a clever and exceptionally useful artificial intelligence module as well, called the Intelligent Assistant (IA).

leangeur resssation (vo.).

An used primarily to retrieve information from the database, has turned out to beside the property of the control of the second of the control of the control of the best open (Andrews of the control of the land of the control of the control of the hard of the control of the control of the well-best one (Andrews of the control of the WPDBMS package, performing manual inquiries, or using the database module only as a source of names and address is for mail-merging But to fall to use the to mais much of the power and venatility of the program—and ado much of the

Toss IA a plain-English query such as "Show me all the salespeople who've aiready met their quotas for the year." Then, sit back and watch it parse—or figure out—that inquiry, respond with a "Shall 1...?" confirmation that it understands

1 . . . ?" confirmation that it understands your intentions, then retrieve and format the information. You'll be reduced to chuckling and shaking your head: How can it do that?

Like PFS:Professional File and Rapid-File, Q&A also has the kinds of data-typing and data-formatting controls described above.

Q&A's DBMS and WP modules use the old PFS: interface. That simple front end makes this big, powerful package as easy to use as low-end, limited-function programs, despite its power.

DBMS, PERIOD And that's really the key to why flat-file managers remain popular, despite the sneers of some database mavens. The best flat-file programs are easy to use yet powerful enough to handle the data-management needs of the great majority of PC users.

The success of Lotus 1-2-3 as a flat-file manager confirms that what many PC users want is not the most powerful and versatile DBMS program imaginable, but rather a familiar, easy-to-use tool that less them store and retrieve information without marching up the steep learning curve of relational database products.

Today's best flat-file products have become in their own way as sophisticated as the best relational DBMS packages. For example, there's nothing like Q&A's Intelligent Assistant available in the world of relational products for PCs. And many of the most powerful relational programs would benefit greatly from the kind of sleek, attractive user interface offered by Professional File, or the user-sensitive adaptable interface of RandiFile.

Today's final-file DBMS packages demand to be taken seriously, as real tools for real work. They ten longer poor relatives of "real" DBMSs, but mainstream DBMS products. Think of them not so much as limited by their single-file-access designs but as programs that have been highly optimized for single-file-access detabase work. Which, it turns out, is a large and important part of the PC data-management universe.

Jim Seymour is a contributing editor of PC Magazine.

Advanced DB Master Advanced DB Master, by Macon Systems.

belies the popular notion that only relational databases can perform useful work for businesses. For \$500, this package offers multiscreen data entry forms, lookup tables, audit trails, extensive field formatting, and a versatile report generator—all without demanding the attentions of a pro-

While previous editions of DB Master incorporated the Pascal p-System as the





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operating system—a particular drawback with a fixed disk.—I was pleased to note that the current version (3.1) is all DOS. Advanced DB Mater still allows any file to span multiple floppies, a necessity back in Apple II days that same heritage, however, gives you dated, monochrome screens and ignores the function keys. Still, development clearly hasn't stagnatical distribution of the control of the distribution of the control of the control of the still still

speed. To design files, you place a maximum of 250 fields into any arrangement of up to 30 screens. Each record must be assigned an exclusive "primary key," for which you may use a combination of fields. DB Master's keys are basically an indexing function. It's easy to create many different views of your file and to speed data entry by designing screens with only the necessary fields. You can also accelerate searches by denoting individual or combined fields as automatically maintained secondary keys. Advanced DB Master supports three levels of password protection for files, fields, or both; it can print a formatted audit trail of all additions and edits during input, and lets you produce purchase orders or payroll checks without extra ef-

INTRICACES The program's computed fields and tookup tables are handy, as they allow some fields to reflect changes made in others. A "long-code table" permits an abbreviation like "AMA" to print on reports as "American Medical Association." Optional range checking, calculations, lookups, and carryover values simplify data entry (though they should all be easier to invinement than the var easier to invinement than the var easier to invinement than the var.

One outstanding detail is Advanced DB Advancer's ability to search through all repeating fields when only one contains the answer. Using this facility, you need to specify the search only once for all fields area than the individually for each field. That means you can, for example, list everyone who bought SpeedWire IP by inquiring into one invoice, or produce the English Let off for each priced by querying from have spent hours counting relational products to device the form of the country of the product of the country of the product of t

OUR REVIEWERS

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puter books.

single command.

Mastering Advanced DB Master's intricacies is a challenge. The package divides reports into subsections for page, data, sort, record selection, and printer commands. I could mix and match previously defined specifications to create an endless variety of reports, labels, or sorts. Even though it doesn't operate in the full-screen

mode currently in fashion, I found the software's line-and-tab positioning method casy to work with. The program will draw a scaled grid over anything in your printer, so preprinted forms become a convenience rather than a nuisance. You can blueprint ieters using the report writer's text mode and merge them without an external wordprocessing package. Turn on the macro recorder and you can program up to 99 keys to print reports or recall data.

The 500-plus pages of tutorial and reference material cover every aspect of Adanced DB Master in detail. The manual reveals a program whose features are unsurpassed in the flat-file arena.

—Michael Friedlander

Alpha/three

Alpha Software's Alpha/three (\$395) is a

menu-driven, flat-file program with at flat-SE III flis tructure, intended for easy data entry and manipulation of files. It's loaded with features that make it a pleasure to use by itself, but the multiple-personality file structure is a boor for organizations that need two levels of database programs for users: one like Alphairhrer and one like dBASE III. With Alphairhrer you can have it both ways.

Alphaithree doesn't have a disk tutorial, but an eight-lesson tutorial in the manual covers everything from setting up a simple file to designing and working with form letters. The manual has a functionally organized reference section, appendixes, and an index.

Even without the manual, you can have Alphathree up and running in just a few minutes. Its basic functions and most of its intermediate ones require only following the on-screen prompts or making selections from mems. Of course, come of the advanced or tricky operations send you may be up to the common of the advanced or tricky operations send you made functions, writing index strings for the equation mode of indexing, and designing fancy reports—are well executed.

To set up files, you fill in a table about field names, lengths, and types, and then get to work. You cannot sort files, but the program has a powerful indexing feature that lets you choose index fields either by table selection or by writing equations. A given index string can have up to 128 charging in the string can have up to 128 charging in the string can have up to 128 charging in the string can have up to 128 charging in the string can have up to 128 charging in the string can have up to 128 charging in the string in the

Vision is the power of imagination. Seeing beyond the obvious. Being able to grasp and comprehend the obscure.

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The information age has presented virtually every field, from research, education, and government to law, medicine, and business, with powerful resources. Resources that, unlike traditional data-based information, are textual. Lacking structure, this ever-growing textbase is most often unexplored, untapped power.

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If you manage an organization with more PCs and peripherals than you care to count, maybe you should consider tying them together — with a STARLAN Network from AT&T.

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AT&T's modular architecture and twisted-pair



wiring make it easy for you to add voice and data stations the same way you add staff; as needed.

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■ FLAT-FILE DATABASES

PC	Flat-File Databases: Summary of Features (Products listed in ascending price order)
MACA766	

	Files	Clear Cet	Pige	database	Filebase	Monager II	Pearl	Filer	Uni-File	Analyst
PROGRAM SIZE	\$35.00	\$69.95	\$89.95	\$95.00	\$99.00	\$99.00	\$99.00	\$145.00	\$149.00	\$149.95
installed program eize (kliebylee)	147	205	500	370	358	522	820	120	280	775
Mie. no. ol program illes	1	1	3	6	1	2	4	3	3	1
FILE STRUCTURE LIMITS										
Size of a 5,000-record lile (bylee)	560,736	625,429	695,349	562,658	514,143	N/A*	606,592	805,180	N/A*	N/A*
Field eize (byles)	80	512	65	70	255	80	80	80	79	254
Fields per record	80	512	70	99	40	250	250	150	99	250
Fields per detabase	80	33,280,000	70	99	40	250	Unlimited	150	99	250
Record size (bytes)	65,535	262,144	1,665	2,048	4,096	Unlimited	20,000	12,000	1,024	16,000
Records per date file	1,520	65,000	65,533	32,000	32,767	32,767	Unlimited	9,999,999	32,000	32,500
No. of data files per database	1	1	1	1	1	1	1	1	Unlimited	1
DATA FIELD TYPES AND MAXIMUM SIZES	67		-							
Cheracter Helde	(80 bytes)	(512 bytes)	(65 bytes)	(70 bytes)	(255 bytes)	(80 bytes)	(80 bytes)	(80 bytes)	(79 bytes)	(254 bytes)
Long text ifelde	(80 bytes)	(512 bytes)	(1.665 bytes)	(70 bytes)	CSS bytesi	(800 bytes)	(80 bytes)	(80 bytes)	(80 bytes)	(254 bytes)
Nemeric fields	(80 bytes)	(512 bytes)	(9 Gigets)	(12 bytes)	into not avadable	(80 bytes)	(16 bytes)	(80 bytes)	(79 bytes)	(15 bytes)
Carreecy fields	O	(512 bytes)	O	O	0	O	(10 9915)	(se shire)	()	(15 bytes)
Date fields	0	(512 bytes)	0	(6 bytes)	0	(ő bytes)	(10 bytes)	0	(6 bytes)	(10 bytes)
Time fields	0	(512 bytes)	0	0	0	(6 bytes)	0	0	O	0
Boolean fields	0	() of sheet	0	0	0	(1 byte)	0	0	0	0
Other fields	0	0	0	(6 bytes)	0	(11 bytes)	0	0	0	(5 bytes)
DATA FIELD ATTRIBUTES	T			,		1				11.17.117
Tests for welld data ranges	0	(user-defined	0	(automatic)	0	luser-detined	0	0	(automatic)	0
Provides detacti values	0	0	•	•	0	•	0	0	0	•
Checks for epecific values	ō	Ō	ō	•	0	o	ō	•	ō	ō
Verifies date vie a lookoa table	0	0	0	(user-define	s	0	0	(automatic)	0	0
Provides selematic data entry from	0	0	•	0	0	0	•	0	0	0
lookop table	O	0	(user-defined	, ,	0	0	(user-debne	d) (0	0
Double-entry verification	0	0	0	0	0	0	0	0	(automatic)	0
Requires all listes to be filled	0	0	0	e laser-define	0	0	(user-define	0	(antomatic)	0
Offers "forced oppercase" option	0	(user-defined	0	(user-cenne	0	0	(USET-DETITE	0	0	0
Converts data formats	0	O (area-same)	0	0	0	0	0	0	0	
Increments Helde	0	0			0		0		0	0
Unique tields	0	0	(automatic)	(user-defrie		(user-defined	1	(automatic)		
	-	-	U	0	0	0	(user-define	0	(User-definer	0
Fised veloce for data entry fields	0	0	(uner-defined	0	0	e (user-defined	0	0	0	0

indicates Editor's Chains: — No. — No. NAV.—Not applicable on PC Labelantia, a 5,000-record file could not be imported. NAV.—Not applicable paggar does not have this feature. "No entire and cusp is localities, this program must be used together with Reporting Assistant (\$175.00). For sorting and cusps is toolties, the program must be used together with EMP Assess Decision Series—Series Series—Serie

	Rejae \$195.00	Sepene: Cerdiile \$195.00	Windows Filer \$195.00	Pieese	PFS: Protes- elonal File \$249.00					Apolio		Omotilie	Advenced DB Mester \$500.00
	1,224	135	200		327								650
5	3	4	3	5	1	2	1	1	2	1	15	3	1
1,676 3,200	624,640 67 256 Unlimited	N/A* 255 25 25 25	700,482 255 300 300	999 99	1,343,488 1,950 3,200 3,200		50 40	64,000 250	1,676 2,182	20,000 2,000	126 128	464,384 1,828 64 Limited by disk	595,968 250 250 250 250
	2,000 9,000,000	16,500 32,767	76,500 9,999,999	2,000 16,000,000	64,000 29,500			10,000	16,780 Up to 18,000 forms			36,560 Limited by disk	3,000 500,000
1	1	1	1	1	1	1	1	1	2	Uelimited	1	1	1
												-0.0	- 30
(1,878 bytes)	(87 bytes)	(75 bytes)	(255 bytes)	(999 bytes)	(1,918 bytes)	(240 bytes)	(50 bytes)	(254 bytes)	(255 bytes)	● (20,000 bytes) ● (20,000	(256 bytes)	● (1,828 characters) ● (1,828	(250 bytes)
(1,878 bytes)	(87 bytes)	bytes)	(300 bytes)	_	(1,680 bytes)	(240 bytes)	(40 bytes)	(64 bytes)	(1,680 bytes) • (78	bytes)	(254 bytes)	characters) • (14	(250 bytes)
(14 bytes)	(14 bytes)	(5 bytes)	(15 bytes)	(16 bytes)	(14 bytes)	(14 digits)			charactere)			characters)	(16 digits)
0	(14 bytes)	0	0	0	0	0	(19 bytes)	0	(7 bytes)	0	0	0	(16 digits)
0	(8 bytes)	0	(10 bytes)	(6 bytes)	0	(10 bytes)		(254 bytes)	(15 bytes)		(8 bytes)	(6 bytes)	(8 bytes)
0	0	0	0	0	0	-	-	-	(18 bytes)	(8 bytes)		-	0
0	0	0	(1 byse)	0	0	0	0	0	(1 byte)	0	(1 byte)	0	(1 byte)
0	(87 bytee)	(3 bytes)	(size info. not zvariable)	(1 byte)	0	0	0	0	(78 bytes)	0	0	0	0
0	(user-defined	0	0	(user-defined)	0	(user-defined)	0	(user-defined)	(automatic)	(user-defined)	(user-defined)	(user-defined)	(user-defin
•	•	0	0	•	0	0	•	:	:	•	•	•	0
0	0	0	(automatic)	0	0	(user-defined)		(user-defined)	(automatic)	(user-defined)	(user-defined	(user-defined)	
0	•	•	0	0	0	•	0	0	0	•	•	•	•
0	(user-definer	0	0	0	0	0	0	(user-defined)	(automatic)	(user-defined)	(user-defined	(eutomatic)	(user-defin
0	0	0	0	0	0	0	0	0	(automatic)	(user-defined)	(user-defined)	(user-defined)	0
0	Outper-deficer	(automatic)	0	e (user-defined	0	• Inter-dational	(usar-delined)	0	(outpreatic)	(user-defined)	•	•	•
0	(caer-definer	0	0	0	0	(user-defined	0	0	(user-defined)	0	•	(user-defined	•
0	0	0	0	0	0	0	e (uper-defined)	•	(automatic)		0	(automatic)	• (user-defin
0	0	0	•	0	0	0	O	•	•		•	•	•
0	0	0	(automatic)	•	0		•	0	•	(user-defined)	•	•	•
	0	0	0	(user-defined	0	(automatic)	(user-defined		(automatic)	(user-defined)	(user-defined	(user-defined	(outerratic



When our custor our LAN, they do

It's easy to understand why our American-made 10 NET* has met with such rave reviews among the 100,000 PC users in the 40 countries where it's been introduced.

Berhaps it's so popular because it's so easy to install over twisted pair or even fiber-optic cable. Perhaps because it's compatible with NET BIOS and also offers communication to the main-frame with IRMALAN™ products and CROSSTALK.®

Perhaps because it's so surprisingly powerful with its easy-to-use software that offers excellent



ners talk about n't mince words.

utilities for resource sharing, print spooling, messaging, conferencing and network management.

Or perhaps because people have found 10 NET to be so cost-effective. But whatever their reasons may be, isn't it time you knew more about one of the world's most popular LANs? For more information about 10 NET in plain English, call 10 NET

Communications, a division of Digital Communications Associates, Inc. at 1-800-358-1010. In Ohio, you can call us at 1-800-782-1010.

CIRCLE 532 ON READER SERVICE CARD

■ FLAT-FILE DATABASES

Flat-File Databases: Summary of Features (Products listed in ascending price order)

DATA FIELD ATTRIBUTES	Files \$35.00	Clear Cut \$89.95	Pice S69.95	detabase \$95.00	Filebase \$99.00	Manager II 599.00	Pearl See.00	Filer \$145.00	Uni-File \$149.00	Analyst \$149.95
Calculated fields on setry screen	0	0	•	0	0	•	•	•	•	•
Carryover from previous record	0	•	() (automatic)	(user-defined	•	(user-delined	0	(automatic)	0	(automatic)
Error handling	0	(automatic)	0	(automatic)	0	0	0	(automatic)	0	0
Dela dictionary/catelog	(automatic)	0	0	(automatic)	0	0	(automatic)	0	(automatic)	(automatic)
DATA IMPORT EXPORT										
DIF	0/0	OIO	••	••	OIO	OIO	OIO	O/O	OIO	●/O
DSF	CIO	OIO	••	00	00	●(*)	OIO	0/0	OIO	●/O
PFS	●\O	OIO	OIO	OIO	OIO	OIO	0/0	OIO	0/0	•10
SOF	0.0	0/0	••	•••	00	••	0/0	0/0	0/0	••
SYLK	OIO	OIO	OI®	OIO	OIO	OIO	OIO	OIO	OIO	0/0
WKS	••	O/O	00	OIO	CIO	OIO	OIO	O/O	OIO	●/O
ASCII	••	••	••	••	•••	OIO	OIO	••	O/O	••
User-defined	0/0	0/0	••	0/0	••	0/0	0/0	0/0	0/0	••
DATA MANIPULATION										
Mae, no. of ledesing fields	40	N/A [†]	70	NA ¹	1	10	1	9	30	N/A ¹
Max. no. of compound indexes	N/A1	N/A [†]	N/A ⁷	N/A*	N/A [†]	N/A*	NA'	N/A*	30	N/A*
Unique Index value	0	0	0	0	0	0	•	0	0	0
Respecity Indexed fields	•	0	0	0	•	•	•	•	•	0
Autometic ledez meintensece	•	0	•	0	0	•	•	0	•	0
Respecify tile deficition	•	•	•	•	•	•	•	•	•	•
Meltiple record deletions	0	•	•	•	•	0	0	•	0	•
Multiple record appletes	•	•	•	•	0	0	0	•	0	•
Meth opdefex	0	0	•	•	0	0	0	•	0	•
Text epdefes	•	•	•	•	0	0	0	•	0	•
No. of view tables	2	1	None	None	None	None	None	None	None	None
No. of jobs tables	2	None	None	None	None	None	None	None	None	None
Union febies	2	1	None	None	None	None	None	None	None	None
Intersect tables	None	None	None	None	None	None	None	None	None	None
Append tablee	2	1	None	1	2	None	None	None	2	15
Max. no. of opes data files	1	1	1	1	1	1	10	1	1	1
SORTING										
Permeeest	•	•	•	•	•	0	0	0	0	•
Temporary (for duratice of command)	0	0	0	•	0	•	0	0	0	0
Sorts on any field	0	•	•	•	•	•	0	•	0	•
Sorts on Indexed fleids only	•	0	0	0	0	0	0	0	0	0
No. of fields sorted at once	2	512	4	3	3	Unlimited	N/A1	9	1	5
SEARCH PARAMETERS										
First accorrences	•	0	•	•	•	•	•	•	•	•
All occurrences	0	•	•	•	•	•	•	•	•	•
Index field only	•	ō	Ö	Ö	•	0	•	•	•	ō
Multiple fields (max. no.)	0	(512)	(10)	(7)	o	ō	ō	ō	ō	

				-		2000						3-6	
					PFS:	Personel Decision							
iling ssistant 195.00	Rejen \$195.00	Sepane: Cardfile \$195.00	Windowe Filer \$195.00	Please \$199.00	Prefes- eionel File \$249.00	Series Deta Edition \$255.00	C.1.P. \$295.00		Q&A \$349.00	Apolle \$350 00	Alpha/ three \$395.00	Omnitile \$425.00	Advenced 08 Maste \$500 00
71	• cuser-defined	Cautomatic)	(automatic)	OI.	e (user-defined)	(automatic)	e (user-defined)	(user-defined)	(automatic)	• tuser-defined:	O (user-defined)	e (user-debited	(automatic
		(astomatic)	(automotic)	(automatic)		(automatic)	•	(user-detined)	•	• (user-defined)		e (user-defined	
		()	(astrume)	(annuality)		(automatic)	(user-defined)	(cost - serimu)	0	•	(user-defined)	•	•
-												-	
0/0	010	0/0	OIO	••	0/0	••		0/0	••	0/0		0/0	0/0
0/0	0/0	0/0	• •	OVO	0/0	••	OVO	••	•/O	0/0		0/0	OIO
0/0	0/0	0/0	0/0	0/0	OrO	0/0	0/0	0/0	• 0	0/0		0/0	0/0
0/0	0/0	0/0	O/O	0/0	0/0	0/0	0/0	0/0	•/0	0/0	•••	O/O	0/0
DIO DIO	0/0	0/0	0/0	0/0	● /O	● (0	OVO	••	•0	0/0		0/0	00
040	•••	0/0	••	•••	••	••	•••	••	•••	•••	0/0	•••	•••
D/•	0/0	0/0	••	OVO	0/0	O/O	O/O	0/0	O/O	OVO	• •	0/0	0.0
UA" UA"	9 N/A ¹	N/A ¹	9 N/A ^t	N/A ¹	N/A'	7 N/A [†]	40 N/A [†]	5	115 N/A [†]	N/A ¹	5 128 characters	2 10	10 10
)	0	0	0	0	0	•	0	0	0	0	O	0	
5	•	0	•	0	0	•	•	•	•	0	•	•	•
) •	:	0	0	:	0	:	:	0	:	0	:	0	:
	:	ŏ			•	ō	0	•		•	•	•	0
)	•	0	•	•	•	0	0	•	•	•	•	•	0
)	•	0	•	•	•	0	0	•	•	•	•	•	0
•	0	0	•	•	•	0	0	•	•	•	•	•	0
fone fone	None None	None	None	None None	None None	None 5	1 None	250 per file None	1 None	Unlimited	None 2	1	None
ione	None	None	None	None	None	None	None	None	None	Unimited	None	None	None
Vone	None	None	None	None	None	None	None	None	None	Unlimited	2	None	None
Vone	2	None	None	None	1	None	1	None	1	Unlimited	2	1	None
<u>'</u>	1	1	None	1	1	1	1	1	1	20	3	1	1
)	•	•	•	0	0	0	0	•	0	0	0	0	•
	0	:	0	:	:	•	:	0	:	:	0	:	0
0	Ö	o	Ö	Ö	Ö	Ö	ō	o	0	o	Ö	ö	0
21	5	24	9	5	64	15	4	15	Unlimited	2,000	0	4	15
•	•	•	•	•	•	•	•	•	•	•	•	•	•
0	:	0	:	0	0	0	:	0	0	0	0	0	0
	-	● (24)	:	0	● (64)	● (10)	e (40)	0	● (2,182)		O.	0	● (20)

PC MAGAZINE APRIL 12, 1988

IMS-286

12 MEGAHERTZ

\$1295

Base System

- · 80286 processor running at 12MHz,
- zero wait state, switch selectable to 6MHz
- 1MB RAM 1.2MB diskette drive
 Phoenix® BIOS
- · Dual diskette drive/fixed disk controller · Enhanced, 101-key keyboard
- 200-watt power supply
 Illustrated installation and
- operations manual Clock/calendar with battery backup

EGA color monitor

1.2MB diskette drive

12MHz, 40MB

1MBRAM

Phoenix BIOS

MonoGraphic System. \$1395

- · High-resolution monochrome graphics adapter card
 • 12" high resolution flat screen display
- 80286 processor running at 12MHz,
 6 to 12MHz switchable clock speed
- 1MB RAM 1.2MB diskette drive
- · Phoenix BIOS · Dual diskette drive/fixed disk controller
- * Enhanced, 101-key keyboard 200-watt power supply
 Clock/calendar with battery backup

12MHz, 40MB

- MonoGraphic System. \$1895 · Monographic system featured above, plus:
- · 40MB fast access (30ms) Seagate hard disk Disk partitioning software

MonoGraphic System. \$2185

 Monographic system featured above, plus:
 70MB (ast access (28ms) MiniScribe hard di · Disk partitioning software

40MB fast access (30ms) Seagate hard disk EGA Color System. \$2535 EGA color system featured above, plus: 70MB fast access (28ms) MiniScribe hard disl

EGA Color System. \$1745

Enhanced graphics adapter video card
 14" tube (13" diagonal) high-resolution

Dual diskette drive/fixed disk controller

EGA Color System. \$2235

· EGA color system featured above, plus:

200-watt power supply
 Clock/calendar with battery backup

· Enhanced, 101-key keyboard

. Disk partitioning software

80286 processor running at 12MHz,
 6 to 12MHz switchable clock speed

· Disk partitioning software

Diskette Drive 360KB or 1.2MB diskette drive to enhance

your IMS-286 360KB. . \$99 1.2MB...\$109

AT I/O Board

Communications support: one serial and one parallel port.. \$139

AT Multifunction Card

0KB expandable to 1.5MB, serial port, pa port, game port. ... \$139

1200 Baud External Modem

wer, auto dial, auto voice/data switching...\$89

Math Coprocessors 80287-8 math coprocessor. . . \$269 80287-10 math coprocessor. . . \$349

Also available...the IMS-286/10: base system \$1045

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IMS-88

10 MEGAHERTZ

Base System

- 8088 processor running at 10MHz, switchable to 4.77MHz
- 640KBRAM . 360KB diskette drive · Diskette drive controller
- · AT-style keyboard · 150-watt power supply · Illustrated installation and operations manual

MonoGraphic System. \$679 adapter card

- · 12" high resolution flat screen display 8088 processor running at 10MHz.
- 4.77 to 10MHz switchable clock speed 640KB RAM
- 360KB diskette drive Diskette drive controller

with Western Digital controller

 AT-style keyboard · 150-watt power supply

MonoGraphic System. \$949 ic system featured above, plus: 10MHz monographic system featured above
 Reliable 20MB MiniScribe hard disk system

- MonoGraphic System. \$1079
- 10MHz monographic system featured above, plus:
 Reliable 40MB MiniScribe hard disk system
- with Western Digital controller · Disk partitioning software

Diskette Drive 360KB diskette drive to enhance your IMS-88. . \$99

PC I/O Board Clock/calendar, serial port, parallel port, game port. . \$65

PC Multifunction Card 384KB RAM, serial port, parallel port, game port and clock/calendar with buttery buckup...\$199

576KB Expansion Board indable to 192KB, 384KB, or 576KB with 64KB or 256KB chips. Comes with 0KB. . . \$35

- EGA Color System. \$1019 Enhanced graphics adapter video card
 14" tube (13" diagonal) high-resolution
- EGA color monitor 8088 processor running at 10MHz.
 4.77 to 10MHz switchable clock speed
- 640KB RAM
- 360KB diskette drive · Diskette drive controller
- AT-style keyboard · 150-watt power supply

EGA Color System. \$1289

 EGA color system featured above, plus:
 Reliable 20MB MiniScribe hard disk system with Western Digital controller

- EGA color system featured above, plus:
 Reliable 40MB MiniScribe hard disk system
- with Western Digital controller · Disk partitioning software

1200 Baud Internal Modem





For Technical Support: 512-250-8794



■ FLAT-FILE DATABASES

(Products listed in ascending										
SEARCH PARAMETERS	Private Files \$35.00	Cteer Cet \$69.95	PC-File Ples \$69.95	Couriney database \$95.00	Filebase \$99.00	Form- Menager II \$99.00	Personal Peerl \$99.00	Petentir Filer \$145.00	Uni-File \$149.00	Reliex: The Anelysi \$149.95
Case-sensitive			•	1.0		•	-		L	
Whele word	•								•	
Velue or character range		•		•	•		•	•	•	
Wildcerd or elring eegment		•	•	•	•	•	•	•		•
Booleen		•	•	•	•	•		•		•
Compound Boolean	0	0	(•	TIL	•		•		•
MATHEMATICAL FUNCTIONS	1									
Date crithmetic			•							•
Time erithmetic										
Arithmetic functions			•	•		•	•		•	•
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c*—Indicates Edition Choice ◆ -lies · ↑—No - NA*—Not explicable in PC Labs tests is 0,000-record lie could not be imported. NA*—Not applicable in program does not have this feature. **Per screing indicate, this program must be used together with Reporting Assistant (8/15-00). **For sorting and cutput Sociates, this program must be used together with IBMs Proconard Security - Report Pull Edition (18/15-00).

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Disk	•	•	•	0	0	•	•	•	0	•
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USER SUPPORT										
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[—]indicates Editor's Choice — No NA*—Not applicable: in PC Labs tests, a 5.000-record file could not be imported. NAT—Not applicable: program does not have this feature. For sorting and output facilities, this program must be used together with Reporting Assistant (\$175.00). For certing and output facilities, this program must be used together with RBAB havenone. Reporting Assistant (\$175.00).

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You can design and store entry screens, indexes, and—a significant time-saver—search lists. You specify a set of field conditions and then save the set with a name and description. If you want to run the same selection process later, just select it by name from a list. You can use the current search list to manipulate a subset of data much faster than by thrashing around in a large file.

THE dBASE CONNECTION Alphalthree's dBASE III file structure less dBASE users take advantage of Alphalthree's easier screen design, entry-checking, and report-writing features. More typically, lower-level users in a company can use Alphalthree for data entry and report production while the systems people use dBASE to create and

maintain full applications. The only limitations are that Alphalithere is limited to 65,536 records, as compared to ditASE's I billion records, and that a well-designed, complex dibASE application usually use for of the That act could made it diffision of the County of the County of the without demanding extraordinary per paraming for the dibASE side. A practical advantage of using Alphalithere with MASEs is that Alphalithere lists for only \$359, while dibASE III and dibASE III Plus each cost \$505.

Alphalthree by itself has no programming language, but when you send in your registration card you get a copy of the works, Alpha Software's keyboard macro program. With Keyworks you can set up your own application menus and automate any feature you can normally perform usine the keyboard.

Alphalthree's role in the dBASE didn't exist, Alphalthree would have lots of ment. It's easy to install, a snap to learn, and suitable for casual as well as advanced users, as long as they don't need multiple-file manipulation or programming capabilities.—Bruce Brown

Apollo

Apollo. from Schmidt Enterprises, is a fast, flexible program that will do just about anything you'd want of a flat-file database, and more. But to unleash this \$350 program's full potential, you'll have to learn to speak its language—and that could take some time.

Apollo plus ACE is like two programs in one. ACE, which stands for Automatic Command Execution, is Apollo's programming language. Even without it, Apollo is a fully operational database program: using the built-in command structure, you can design and edit forms, add records to your database files, perform complex searches, import and export data, print reports, and generate mailing labels, ACE enables you to customize the program's operating procedures, add new routines, and build small applications. The language uses 38 unique commands (actually 76, with indicators), 7 function indicators, and 3 variables. Apollo's screen has a pristine sparseness. The program has only two nemuses a main menu and adic nemu; all not not operations a main menu and adic nemu; all not proper parations are command driven. (Using ACE, however, you can add your own menus.) Getting used to Apolo's manual feet lakes some time, though the commands are not really difficult to learn, and each functional area of the program has a help screen that lists and explains the available instructions. Apollo's documentable instructions. Apollo's documentable instructions. Apollo's documentable instructions in a decay and no tutorial—makes the program seem denser than it actually is.

Unlike some databases, Apollo docent make you enter the field sizes or types when you're designing file records. You simply place the fields where you want them on the screen, leaving enough room to accommodate the maximum number of characters the field will take. Apollo automatically treats numbers as numbers as text as text, as own don't have to specify these field attributes. If you want, however, you can make certain fields "numbers" by assigning them a numeric attribute.

Though Apollo doesn't index records, it is fast nonetheless: since the program is small, requiring only about 90K RAM, it can hold all or most of a database in memory. If the database is larger than the available RAM, Apollo builds temporary disk files and shuffles them in and out of RAM. This slows the program down substantially corting 500 records in ascending order on one field, for example, took 3.1 sec-





two disk drives (hard disk

recommended), DOS 2.0 or later. In Short: Alphativer features flexible, clear-cut data entry and report design as well as screen painting features. Though it is not programmable, registered users get the Keywork's Keyboard uncer porgram free. Because their data files are computable, Alphatinfree and dASSE III Plas can be the Alphatinfree and dASSE III Plas can be the behavior of the same organization. Not copy prolected.

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■ FLAT-FILE DATABASES

DEFINING RECORDS



Alpha/three's Field Rules section mokes it simple to specify values for a field, verify entries, or set uppercase and other attributes. Just move the cursor to a desired rule field and select the defaults or two template parameters.



Though database creation in Rajan is not for the untrained user, its screens are notably simple. Here, fields have been filled in on a data entry screen, with commands displayed at the bottom.



To enter fields in Palantis Piler, you must count the characters in each field and indicate the first and last characters.



Specifying entry screen field coordinates is the first step in defining a file in Uni-File. Line-based editing slows down the task.



A pull-down menu in Windows Filet lets you manage records. You click the mouse to indicate your choices. To update a record, though, you must confirm or deny each change.

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In Touch with Tomorrow

■ FLAT-FILE DATABASES

onds on an IBM PC AT that had 640K of RAM; with 5,000 records, which exceeded the machine's available RAM, the same sort took around 2 minutes.

SEARCHES AND BUFFERS Apollo teles you search on any field or combination on any field or combination of fields, though all the criteria must be met for a match. You can enter the complete data, any number of characters at the right or left end of the field, or characters that would appear any where in the middle. For numerical searches, the program allows you to use greater-than and less-than symbols.

One of the trickiest things about working with Apollo is mastering its use of buffers. Apollo its you define the amount of on-line memory any file takes by expanding or diminishing the graphic buff that represents the buffer on a special buffer screen. Clearly, you'll want to give a large file a good-sized chunk of memory, so the program will use the disk less often.

Though only two buffers can be active at once—aprimary buffer, where they are conception buffer, where they are condary buffer, et, which acts as another data respecche—the program can divide available memory into up to 2b buffers. This conmight use several buffers to hold your ACE-written programs until your reagans until your reagato use them; also, you can quickly create a new database in your secondary buffer tile.

Apollo is not the easiest program to use, but it's certainly a flexible one. Armed with its programming abilities, you can suit the package to your taste.

C.I.P.

-Henry Fersko-Weiss

One look at the documentation and you know that Concentric Data Systems' \$295 C.I.P. is a well-designed product. Included are an eight-page pamphlet on getting started, a comprehensive accordion reference card, a tutorial booklet, and a detailed, easy-to-follow reference manual with illustrations.

After installation (a simple process), you'll find that the excellent support materials are just a prelude to the attention spent on C.I.P.'s ease of operation. This is per-

haps most evident when you're using the rengram's And serven, which gives you a blank form to add records to the file you're working in. In the secrem's lower-left-hand corner, a neverse-video box tells you that he Add function is active and gives you cent full. In the lower-right-hand section are graphic symbols for the command keys available; the symbols of the command keys available; the symbols change automatically as your command options change. If you forget what the command keys do you good to the property of the

19 pt. 2. The cost one goes beyond just as visual cues. You can enter the current due, for example, into a date field with a press of F4. You can amortiacistly repeat part or all of a field in a number of records by entring the data the first time as a default value. Chri-Backspace reases a whole field or the part of it that isn't set as a default. The program is even accommodating when it comes to fiferames, allowing labels up to 16 characters long. That means as "Shipmen Orders" instead of a more cryptic eight-character alternative like "Shipords."

FIELD WORK As you create the file record form, you specify the fields' sizes and attributes. After each field name, a line of ten little boxes appears, representing the spaces in that field. You set the length by increasing or decreasing this line of boxes with the arrow keys or by typing in the number of spaces.

By selecting attributes you can identify fields as text, numeric, or calculated. You can also designate key fields, which in this program are the only ones that can be searched.

That scheme can get awkward if you work with a variety of databases, since you might forget which fields you've designated as keys. C.I.P. lets you set as many key fields as you want, but you shouldn't do so casually: making a field key entails an ascending sort, which can add time, particularly on tasks like importing data from another source.

C.I.P. offers a few other attributes that can help to ensure proper data entry or to speed it up. The Automatic attribute, for example, enters field data without requiring you to record it by pressing Retum. Once you've entered field particulars, you can easily rearrange your forms.

can easily rearrange your forms.
The program also has extensive reporting facilities. You can, of counse, define a report so that it includes only the subset of file fields you want, and CLP, lets you seek to the proper so that it may be used to a superior and the program of the program of

Perhaps the main limitation of C.P.P. is ininhility to do multiple-record updates. That means you can't do a global searchand-replace—if a company name changes, you may be company to the company of the company of the field changes.) Also, C.I.P. is slow enough to be inksome when you're working with larged alabases. For example, importing a file of 5,000 records with 12 letiteds, only one of which was a key field, took over as hour. Still another limitation to the contraction of the company of the company of your base arithmetic.

If these drawbacks don't put you off, you'll find C.I.P. a friendly, easy-to-use flat-file DBMS package worthy of your consideration.—Henry Fersko-Weiss



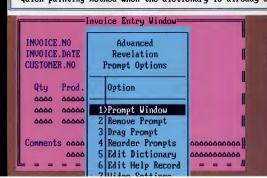


Concentric Data Systems Inc. 18 Lyman St. P.O. Box 4063 Westborough, MA 01581 (800) 325-9035

(617) 366-1122 List Price: \$295

Requires: 192K RAM; two disk drives (hard disk recommended); PC-XT, AT, PS/2, or compatible; DOS 2.0 or later.

In Short: Easy to learn and easy to use, C.J.P. has a number of facilities that speed up data entry and file design; its reporting functions are also good. However, C.J.P. is slow, doesn't support multiple updates, and has limited multi functions. Not copy protected. CREST 684 DEPENDENT CREST. Advanced Revelation Paint Main Men
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Clear Cut

Business Day Software chose an appropriate name for its simple, clear-cut, \$69.95 database program, Clear Cut. You invoke all the program commands with the ten function keys. The clean screens offer useful status information under the work area. And the program's operations are so simple you can perform them with little reference to the manual or help screens.

Yet Clear Cut is somewhat limited. Although the program can search and extract data from large files speedily, large databases overwhelm its sort routine. If a file is too large to be kept in memory, Clear Cut swaps back and forth to disk, causing a dramatic slowdown. The 5,000-record test file, for example, took 2 hours and 31 minutes to sort on one field.

Clear Cut lacks math capabilities. None of the fields in a record can be calculated fields. Even when producing a report, it cannot do math operations, but it will generate totals, subtotals, counts, maximums, minimums, and averages,

The form is the heart and soul of the program. Record and report forms are quite simple to create. After you've created a form, you can use it as a template for another. You can also add design elements, using underlining and boldface as well as single lines, double lines, corner indicators, crosses, and so on,

SEARCHING Clear Cut's search facilities are both flexible and powerful. At the broadest level you can browse through records one at a time, going backward or forward. While browsing you can select the whole file, previously marked records, or all unmarked records, and you can update. delete, or print records.

More-complex searches take place in the overy mode. You enter the criteria in the fields you want to search. You can enter exact values, or you can enter string values for either end of the field or anywhere in it. You can also enter a Boolean NOT to a query. A numeric search allows you to search for entries greater than, less than, or within a range. But entering search criteria directly in the fields means that the fields must be long enough to accept them. Adding space to accommodate search criteria takes up disk space and slows down the sort routine.

Extracting data is easy, but you must link fields together manually on a split screen that shows both forms. While this procedure takes some time, it allows you to transfer data from one field to another field with a different name

Clear Cut's ease of use and flexibility make it well suited to personal and smallbusiness use. But its lack of math and calculated fields and its slow sort speed with large databases limit its efficiency and effectiveness for large-business applications.-Henry Fersko-Weiss

matically for all records, or a default it will enter only if you press the Enter key on a given field. A "ditto" feature repeats the contents of the field from the prior record. A serialized transaction feature will automatically number records.

Courtney will even produce a checksum with the field data to make certain that the entered data is correct. This option requires a special procedure to generate the list of values with their checkdigits, but it can make entering items such as part numbers far more accurate.

ROUGH EDGES The program offers you limited ability to place the fields on the data entry screen, using a form of coordinate entry. You must design your screen "blind": no sophisticated screen paint techniques are found here. On the other hand, Courtney supports up to nine separate screens for input.

Reporting is plagued with similar inconsistencies. You have a number of calculation options, but since the only output destination is the printer, we were unable to use the report writer for the PC Labs timed tests. Instead, we simply exported a file of the requested data, without subtotals or totals. The report formatter supports subtotals, sorting on two fields, and multiple record-selection criteria.

To operate the program, you select two-character options from full-screen menus. There is no on-line help. The manual is unwieldy, printed from daisy wheel





List Price: \$69.95, plus \$5,00 shipping and han-Requires: 128K RAM, one floppy disk.

drive (hard disk recommended), DOS 2.0 or

In Short: Clear Cut is easy to use, with a flexible search capability. Creating record and report forms is also easy, and reporting offers good flexibility. But the program is extremely slow when sorting large databases, and it lacks basic math operations. Not copy protected. DROLE 643 ON READER SERVICE CARD

Courtney database

According to the date stamps on its program files, Courtney Business Systems' Courtney database has not changed in more than 2 years. Unfortunately for the vendors of this \$95 database program, users' expectations have advanced a long way in those 2 years. And Courtney's stagnation is unfortunate for database users, too, because the program offers some truly interesting features.

On the one hand, the program has only four data field types: alphanumeric, integer, real, and date (which must be entered in the MMDDYY format). On the other hand, eight different input specifications are available, including some powerful and useful options. You can specify a default value for the program to enter auto-





710 W. Main St. Arlington, TX 76013 (817) 275-6710 List Price: \$95 Requires: 256K RAM, two disk drives,

In Short: Outdated and plagued with inconsistencies, this flat-file database program has some handy options and some tedious limitations, especially in data entry and reporting. CIRCLE 642 UN READER SERVICE CAR

The best ad for Key Tronic keyboards is a close look at the competition.



Last spring a certain quality conscious consumer purchased what he thought was a Key Tronic

KB 5151 Professional Series kevboard from a local retailer.

This same Look for the Key Tronic Professional consumer later Series label on the keyboard's top

returned the keyboard to Key Tronic with a letter of complaint. The product, shown above, was used for just over a year, though it looks like it was abused for much longer. Some of the key-

cap legends had worn away, and had to be replaced by the stickon labels you see here. Truth is, while the above

product was sold as a Key Tronic

keyboard, a Key Tronic label never appeared on the product. There is no way it could have. Because only keyboards bearing

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Close examination will tell you immediately if the keyboard vou are pur-

chasing is from Key Tronic. First, look for the Key Tronic Professional Series label in the top left hand corner. Look also at the keyboard's legs to see if they have a rubberized non-skid covering, just another of the Key Tronic extras that ensure better performance. Of course there are other features, not initially apparent, that

separate a great keyboard from a mediocre one. Take Key Tronic's double shot molding, for example, a process that prevents the keycap legends from wearing away (which proves that the keyboard shown above is not from KeyTronic but

use a less permanent rather the handi- printing process. work of a lesser manufacturer). And then there is Key Tronic's limited three-year warranty: a



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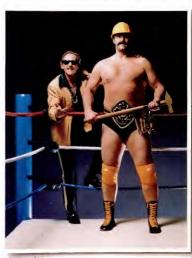
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In the first two months of the year, there were 37 westling matches held in or country. From a 57,000 sent arena in Denver to a 3,000 sent juntor college

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Linda Connell, the chairperson of the Bismarck Meetings Group. "The amount of the tax, which varies depend-ing on the item taxed, hasn't affected Spring | Summer 1955

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Benchmark Tests: Flat-File Databases

No single result can be used to rate a database manage-ment system's effectiveness. Fast data import times may look impressive, but most applications import data only once. Fast sorting times are desirable, but sorts are performed infrequently, especially if a database package maintains an index (or key) of your records. Searches, on the other hand, are performed frequently in most typical applications.

The key to interpreting these results is to compare the times for the 50- and 5,000-record tests for the same product for any given function. Ideally, although a 5,000-record test contains 100 times more records than its 50-record counterpart. the results from the larger test should not be 100 times longer than those of the smaller. If they are, then the product may not have buffers large enough to retain large segments of data in RAM and may degrade performance by continually polling data to and from disk. Alternatively, the product may not have algorithms that are optimized for ordering and indexing. For instance, of the tested packages that perform sorts most slowly, C.I.P. sorts to disk and in the process creates a temporary file. When the sort is complete, the old file is removed and the temporary file replaces it. Q&A, which does the fastest 50-record sorts, needs no time to sort an indexed field (the index is always sorted); will sort in memory if the total field data of all records will fit; or, in worst case, resorts to a temporary disk file when the amount of field data for all records exceeds the available RAM.

To measure the database management performance of these programs. PC Labs ren the programs through six common DBMS operations, including imports, ex trects, text updates, sorts, searches, end report generation. The test results published here do not include the time it took the reviewer to set up an operation, but only the time it took for the program to perform the test. In cases in which multiple steps were needed to set up a procedure. we timed all program operations and added them together for the final result

The database that we used for the testing consisted of the inventory transaction records of a fictional eutomotive parts distributor. It had one file with 12 fields per record. The field date types included integer, text, double precision, end date. Because a given program's performance may vary with the size of the detabase, we report the results of each task using databases of 50 and 5,000 records We ran all tests on en 8-MHz IBM PC AT

equipped with e 32MB hard disk, a 2MB RAMdisk, an Intel PS/286 board, and

DOS 3.2. The Import test measures how quickly the database can import an ASCII file (of either fixed-field length or comma-delimited format) with an index on the first field. We included the indexing portion of the test to avoid penalizing programs that automatically index the first field during the data conversion. Some progrems required a

two-step process for this test: an import followed by indexing The Sort test measures the time it takes for the package to sort the files on an unindexed field in ascending order.

The Extract test measures the time it takes the program to extract two fields from the detabase and send them to a RAMdisk or to the screen. As part of the procedure, the DBMS was also required to sort on one of the fields and select fields that metched one specified criterion. We output the file to a RAMdisk or to the screen to eliminate

printer performance as a factor in the timed results.

The Search test locates the first record that satisfies two criteria (make = Fendhi end model = coupe). Note that some programs ere unable to search on more than one field

The Text Update test reflects the time necessary to seerch for and replece a specified text field

The Report test records the time it tekes to generate e relatively complex report. To create the report, the reviewer was required to perform the following tasks (1) Extract records with fields that match either one or another amount (e.g., the 'year" field had to equel 1988 or 1989). (2) Select 7 of the 12 fields in the record. (3) Sort on 2 fields, one in ascending, the other in descending order. (4) At the break-

points in a specified field, celculate subtotals, then calculate the grand total at the end of the column. (5) Send the resulting file to a RAMdisk.

■ FLAT-FILE DATABASES

output on single-sided 8½- by 11-inch pages in a three-ring binder. A fairly good index is included, as well as a section called "Get a 'Running' Start," an informative and effective tutorial.

Courtney does a good job of data import and export, though it failed to handle the date import correctly (requiring that the date fields lack the separating slash characters that were present in our test files). The program performed many of the tasks rapidly, including the global updates.

The rough edges and constrained functions of Courtney were probably much easier to overlook 2 years ago when it was new. Users are more sophisticated now, and while some may find Courtney a useful tool, most are likely to discover that its limitations obstruct their appreciation and use of it.—Alfred Poor

Filebase

Filebase, from EWDP Software for \$99, is like an insect that has become so distorted through evolutionary adaptation that you wonder how it could have survived. Although it has some features that may be found indispensable, its very existence will baffle most users.

The label on Filebase's single program disk assures you that it has been "preinstalled with the clear-screen codes for your computer." The importance of this notice becomes apparent as you wade into the pa-



Performance Times	Extract		
(Times given in seconds)	50 records	5,000 records	
C.I.P.	7.20	109.00	
Personal Pauri	9.78	112.20	
Private Files	1.75	91.98	
Advanced DB Meeter	3.25	44.48	
Rajan	7.20	178.10	
Personal Dacision Series	3.04	181.06	
Paleotir Filor	1.17	26.84	
Uni-File	N/A	N/A	
Wiadows Filer	13.23	388.33	
Filebase	5.62	121.15	
Please	5.50	102.00	
FormManager II	2.43	N/A	
Courtney database	1.43	79.76	
Filing Assistant	3.23	N/A	
Alpha-Three	5.63	142.72	
Sopona:Cardfile	1.09	N/A	
PC-File Pige	0.96	137.46	
Claar Cut	1.49	31.86	
PFS:Proteccional File	1.84	90.90	
RapidFile	1.55	32.26	
Omnillia	2.50	150.00	
Rallax: The Analyst	1.44	17.74	
DAA	10.40	45.72	
Apollo	0.30	143.00	
N-A—Not applicable: product could not perform Performance Times Times oven in accords)		Search	
	50 records	5,000 records	
C.I.P.	18 88	261.46	
Parsonal Pearl	N/A	N/A	
rivata Filas	1.00	1.00	
dvanced DB Master	0.43	5.87	
ajea	0.81	21.80	
arsonal Oscision Sarias	1.57	3.82	
Polantir Filer	3.53	23.10	
Uni-Fila	NA	N/A	
Windows Filter	2.42	5.10	

1.82

0.39

0.66

0.83

24.60

8.50

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PFS:Protessignal File

es: The Analysis

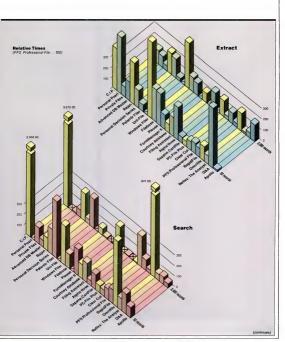
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It simply works better.

perback manual, which includes instructions on how to configure the program to run with the ASCII terminal on your CP/M system. Yes, the manual even refers to PIP, the CP/M precursor of the DOS

COPY command

The program doesn't get much better. The opening menu is a mishmash of 11 different wordy, slightly confusing options. The manual explains that if you change your mind while running the program, you can use CNTRL-C [sic] to exit. At another point the manual warns that you can safely exit anytime except during data entry, when exiting will cause you to lose all new records

Filebase's user interface is based strictly on a scrolling teletype display; even dBASE has advanced beyond that point. Filebase lacks formatted data input screens and fancy report formats, and its manipulation facilities are limited. It even lacks a full-screen data edit capability.

In fact, Filebase has a narrow range of features. Designed to perform specific tasks on comma-delimited files, it can sort and select records from a delimited file. and it can index and edit records once it has processed them. Its main attraction is that it is indifferent about the status of a field; it does not really care whether the data is character or numeric, and it permits variable-field-length data entry up to 255 characters.

OBSTACLE COURSE As you will notice in the benchmark test results, Filebase couldn't even begin to perform some required tasks. It cannot search on two fields nor do global updates. A new version, 7.1, reportedly can print to disk.

Don't let some of the relatively attractive times for the other tests mislead you. In many cases we had to perform the task by running two or three separate operations, each of which involved answering a batch of questions in a series of prompts. The clock ran only during the execution of the procedures, and the results give no measure of the time it took to set up each sten.

The manual is little help. Produced from a dense, 12-pitch daisy wheel printout, it meanders through the different menu options. Although the introduction refers to the manual as a "tutorial," there

Performance Times	Import		
(Tittle's given in seconds)	50 records	5,000 records	
C.I.R	23 90	4,118 40	
Personal Paerl	11.19	953.27	
Private Files	794	972.09	
Advanced DB Mester	6 30	648.06	
Rajan	12 80	682 00	
Personal Dacision Series	491	321 47	
Palantir Filer	0.66	74 10	
Uni-Flie	NA	N/A	
Windows Filer	6.80	\$\$2.07	
Filebase	0.73	157.07	
Please	6 20	562 20	
FormMansger II	47.68	NA	
Couriney dalabase	2.17	169.80	
Filing Assistant	N A	N A	
Alphe three	18.66	778 42	
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PC-File Plus	3.19	295 74	
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PFS:Prefessionel File	6.47	979.68	
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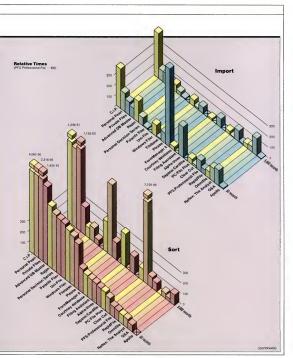
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are no exercises for you to follow.

The few extra little programs that come with Filebase do other clever things with files, enhancing the rambling effect. They perform such operations as working with an external index, which you have to build yourself by extracting and sorting a separate file from your database.

In short, you need to understand a fair amount about databases and how they work before you can make much sense out of Filebase. And if you know that much, you won't have much patience for its

rough edges.

If your applications require you to manipulate comma-delimited files, Filebase could come in handy. Otherwise, plenty of other programs reviewed here present far

better options for both power and ease of use.—Alfred Poor

Filing Assistant

IBM's Filing Assistant is an easy-to-use flat-file manager that lists for \$195 and is designed to share data with other programs in the IBM Assistant series. The program is actually a relabeled version of Software Publishing Corp.'s PFS:File, the precursor to PFS:Professional File, which was introduced a year and a half ago. This IBM revival of the old product is rather limited by itself. You'll need to add IBM's \$175 Reporting Assistant program if you want to sort more than one field in ascending order, or if you want reports with something more than your selected records, with fields printed in the order entered on the data entry screen.

Filing Assistant's case of learning and use is due to its menu-driven commands and the context-sensitive help that is always available on the Fi key. This on-line help is complete, and in some cases it provides better guidance than the instruction manual. The latter teaches by stepping you through the development of a sample application. Although the tutorial is woren to be about the context of the program's features by the time your Complete it.

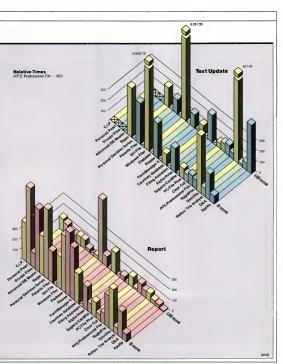
You must use the install program sup-

plied with the package either to create working backup floppies or to install the copy-protected Filling Assistant onto your hard disk, You are allowed only two back-

Benchman Flat-File I	rk Tests:
-------------------------	-----------

Performance Times (Times given in seconds)	Tex	Text Update	
	50 records	5,000 records	
C.I.P.	N/A	N/A	
Personal Pearl	N/A	N/A	
Privata Files	N/A	N/A	
Advanced OB Master	N/A	N/A	
Rejen	4.90	114.10	
Personal Ducision Series	N/A	NA	
Polantir Filer	4.11	84.00	
Uel-File	N/A	N/A	
Windows Filer	134.86	3,337.76	
Filebase	N/A	N/A	
Please	3.50	78.70	
FormManager II	N/A	NA	
Couriney database	1.09	54.71	
Filling Assistant	N/A	N/A	
Alpha/three	2.39	156.96	
Sapona: Cardfile	N/A	N/A	
PC-File Plus	1.07	31.68	
Clear Cut	0.78	50.55	
PFS:Professional File	1.07	63.56	
RapidFile	0.94	34.12	
Omnitita	5.60	534.59	
Reflex: The Analyst	0.84	14.53	
Q&A	2.65	43.30	
Applie	0.80	289.40	

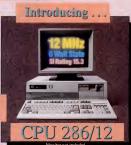
Performance Times (Times given in seconds)	Report	
	50 records	5,000 records
C.I.P.	5.28	246.97
Personal Pearl	10.61	200.34
Privata Flins	2.02	124.39
Advanced Oil Master	8.66	126.85
Rajao	5.40	175.50
Personal Decision Series	9.62	179.11
Pelantir Filer	4.27	62.33
Uni-File .	N/A	NA .
Windows Filer	4.50	70.55
Fliebase	7.90	1,287.91
Please	8.90	200.70
FormManagar II	7.23	N/A
Courtney dalabase	4.13	422.54
Filing Assistant	N/A	N/A
Alpha-three	3.31	79.01
Sapana: Cardille	1.35	, N/A
PC-Fite Piss	2.08	211.60
Clear Cut	0.96	41.07
PFS:Prolesaional File	1.47	216.71
RepidFile	4.48	142.51
Omnifile	5.85	155.66
Reflex: The Analyst	0.92	85.17
Q&A	3.70	68 99
Apollo	1.06	17.90



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ENTERING DATA

Courtney database's data field definition screen gives you a limited ability to place fields on the data entry screen. However, you must specify the rows and columns "blind," using a form of coordinate entry rather than screen-painting techniques.

```
Committee of the commit
```

Personal Pearl's input and edit screens may contain text and prompts in addition to the field labels. A linking process allows the program to bring data from nine other files into the input form.

up copies and five installations, although there is an uninstall option that allows you to reinstall the program onto another hard disk.

DATA ENTRY Development of your data entry screen is very straightforward: you merely type a field name, followed by a colon on the screen where you would like

 Filing Assistant's ease of learning and use is due to its menudriven commands and context-sensitive help.

it to appear. Your data entry form can be up to 32 screens long, with 100 fields per screen. Additionally, you can define up to 100 calculated fields, which are the results of performing the four basic arithmetic operations on one or more other fields.

The instruction manual cautions that

you must give some attention to the order in which you lay out fields on the design screen. This is important because without hassistant will print the fields only in the order in which they appear on the data entry form. You can redefine your layout, however. When you do, Filing Assistant will prognarize all esisting data to accomodate

the new layout. Using the data entry form you developed, you then add records to your database. Function keys let you copy data from fields in the previous record or insert the DOS time or date into a field. Records can be reviewed or updated only in unsorted order. The records selected to be reviewed, updated, or printed can be limited by using a full range of relational and wildcard operators.

One major drawback of Filing Assistant is its inability to import or export data and is its inability to import or export data conside of the IBM Assistant series environment. While you can use Filing Assistant's data with the other Assistant series programs, you can't import or export files in any format for use with programs like Latus 1-2-3 or dBASE.

And although Filing Assistant's in-

doesn't offer a customer-support phone number in case you need assistance. Instead, you're left with contacting a dealer who, in turn, will contact IBM with your problem and relay the company's solution to you.

IBM's Filing Assistant is easy to learn, but its limited features, coupled with an al-



very limited on its own. You'll need IBM's \$175 Reporting Assistant to sort more than one field in accending order or to construct anything fancier than a bare-bottes report. Copy protected. CIPCLE STRUCK PLADER SERVICE CAPO.

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most mandatory supplemental purchase of Reporting Assistant, make it a poor value in flat-file data management.
—Craix Ellison

FormManager II
Forms-oriented programs are a viable concept for end-user-oriented application programs. BIT Software's FormManager II
(599) tries to be such a program but falls short in its execution.

short in its execution.

A forms-oriented data manager, FormManager II uses a screen painter to create
its data input forms and define the data
files. The program supports indexing and
input validation, and it allows you to link
various field calculations and math functions with each file. I can output records
one at a time, in groups using print specifications, or in sorted order using a separate
Report Writer facility.

Report writer facility.

Three modules make up FormManager
II: a Forms Editor, a Create module (for
data file creation), and a Data File Manager. The Report Writer, one of two separate
utilities included with the program, is designed for printing customized reports; the
other, a Database Restructure module, is
for modifying the structure of an existing
database.

FormManager II's Forms Editor produces complex data entry forms, diagrams, and charts. Database fields are defined in the data entry form, and each

database can have up to ten different forms. Each field can be defined with a number of attributes such as type, length, range, default value, and display characteristics including bold, underlined, no

display, and color.

FormManager II allows nine different field types, including date, time, Social Security number, and phone number. It also supports "repeating fields" or field arrays. The latter feature saves space, will all fields in a field array using the same definition, and saves time in both defining and calculating fields. You can easily perform calculations on these arrays in special calculation files.

The program can use as many as ten key fields as indexes, but the manual suggests using no more than three to maintain data entry speed. All indexes are main-

tained automatically.

The Create module creates a database structure from the field definitions contained in a form like You can also create add/SCS III data files from the FornMan-time of the Contained in a form like you can also seem and field attributes. FornManager I may traverse and field attributes. FornManager III (seell-ength record SCDF) format, but unfortunately we were unable to import more than \$58 records with filts version of the production of

The Data File Manager retrieves data, searches for specified records, imports records, prints forms and records, and defines formulas to be used with the data file. One record is displayed at a time, and you can search for records by matching one field only or by searching for the occurrence of a specified string anywhere in the record. Oddly, the single-field search looks forward in the file, and the string search looks

backward from the current record.

Print specifications and calculation
(C.A.I.) files are associated with each database file. You use the print specifications
file to print records or fields in a prespecifiel format. The C.A.I file lets you define
calculated fields by setting up mush functions and using special "meta-functions"
resembling BASIC's IF, FOR NEXT, and
GOTO statements. The meta-functions
control the order of calculations and whether functions are performed condi-

tionally or repetitively. Math functions can contain field names; conditional operators, trigonometric, statistical, and string functions; and up to 26 seratch variables. You can edit .CAL files—which can be up to 50 lines long—with FormManager's built-in editor or a word processing program.

The Data File Manager can perform simpler calculations by using a pop-up calculator. Calculations can be on field values, and the program can replace fields with calculated values.

LIMITATIONS Although FormManager II allows complex screen designs, elaborate data validation, and field calculations, its query and data retrieval capabilities are limited. To see multiple records at

■ A forms-oriented data manager, FormManager II uses a screen painter to create its data input forms and define the data files

a time, you must output the records as a list to the screen or the printer.

The Report Writer utility is accessible only after an exit to DOS. It handles sorting, but it sorts the data only temporarily, sorting any number of fields in ascending

order only.

The program's documentation includes a simple tutorial section that covers the basics of using the program. Help is accessed with the FI key, which presents a pop-up

explanation of the Alt and function keys. BIT Software supplies free phone support for all FormManager II users, but the support staff was limited to two people when we tested the program. The company offers specialized on-site training to corporate customizes forms, database files, and report files for users on request, for necetiated fees.

Overall, FormManager II , Version



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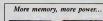


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OUERYING THE DATABASE



Advanced DB Masser offers a unique repeating fields feature. With it you can initiate a query in any one field, and the database will search all fields. After a successful query, the program returns you to the input edit field shown here.



Querying is one of Omnifile's fortes. You can query on multiple fields using the screen above. Queries can specify the relationship between one field and another, or you can enter a specified value as illustrated here.



You use this PC-File Plus search screen for simple queries, global operations, and reports. You can request the on-line help window by pressing Alt-H, then move it to any screen position so as not to obstruct your view of on-screen data.

3.3, is riddled with quirks and anomalies that make everyday data management more of a struggle than a pleasure. The screen design and field calculation capabilities are powerful, but their usefulness is hidden behind a sluggish and somewhat confusing software design. These problems, as well as the apparent limitation on imported file sizes and the weak technical support, make FormManager II an ill-advised choice today—Greg Alway.

Omnifile

If comprehensive flat-file database management is what you hanker for, Omnifile could be for you it competently handles all creation, modification, query, and report aspects of a single-file database. This wellexecuted program's only drawbacks are its \$425 price tag and somewhat archaic

screen design.

Omnifile carefully balances power with ease of use. You define a database as you

create the database form, moving your cursor to the desired field location and typing your data label. When you enter a field's length, you also specify its format: enclosing the number of characters in brackets indicates alphanumerics, while braces specify numerics. A database form can have a hefty 20 pages per record, with a total of 64 unique fields and 20 duplicate fields: further, Omnifile will copy and paste an existine field label and definition to a second loine field label and definition to a second lo-





SSR Corp 1600 Lyell Ave Rochester, NY 14606 (716) 254-3200 List Price: \$425 Requires: 256K RAM. two disk drives, DOS 2.0

In Short: A solid flat-file database that combines ease of use with power and flexibility, particularly in its database query options. Not copy protected.

cation with a single keystroke.

With Omnifile, you can quickly design alternative database forms by calling up and modifying an original to provide different views of the same data. Unlike other, more restrictive databases, Omnifile lets you search or query on nonindexed fields, though using an indexed field expedites the search; you can establish two separate indexes, each containing five fields. Data entry is further facilitated when you set up maintenance tables that can check for valid entries within a specified range. list default values, and enter the results of a calculation.

MEANINGFUL REPORTS Database query is one of Omnifile's fortes. You can specify nine conditionals for a query, and the program can match a conditional statement against a second data field or a specified value. The query can contain wildcards, ignored characters, ignored positions, and even an "and/or" condition. You can query and update using derived formula fields, too, which incorporate the program's basic math functions. These same conditional and derived-field features are available for global updates and for use in copying data. In addition to creating merged and split database files, the Copy Data function can transfer information to and from ASCII and .DIF formats or from one Omnifile database to another

The program lets you create meaningful reports, using not only conditionals and derived fields but also Omnifile's abilities

to average, total, count, break on a field, and sort in ascending or descending order (and on more than one field). You can print to screen, file, or disk and output wide-columned reports, too. The only printers Omnifile recognizes, though, are Epson, Okidata, or a generic printer.

Omnifile is not omniperfect, but the flies in the ointment are few. The single biggest boo-boo is a lack of pathname support-to import my data, I first had to copy the file into my Omnifile subdirectory. To make matters worse, the only extension Omnifile accepts for an ASCII import is .ASC; since the program lacks a built-in DOS facility, I had to exit the program and rename my import data.

The documentation, while explicit, is verbose and poorly laid out, and there's no on-line help. The program screens, too, are sometimes hard to warm up to-they lack courteous navigational commands. And the ability to turn off the program's

beep would be welcome. In 1988, a program's savvy must be equal to or greater than its user's. Omnifile could use a new release to compete in these modern times. Even so, this package has the backbone of a good database program, offering ease of use without compromising productivity.-Robin Raskin

Palantir Filer Windows Filer

Palantir Software is parent to the \$145 Palantir Filer, which runs under MS-DOS. and the \$195 Windows Filer, which operates in Microsoft Windows. But considering today's competition, Palantir has little reason to be proud of its progeny, which haven't matured at all since we evaluated them more than 2 years ago.

Palantir Filer, the DOS version, uses a streamlined menu from which you access a data entry form or an existing data file; from there, your command choices appear along the bottom of the screen. The program assumes that you know DOS, however. It uses a beyy of filename extensions to identify the types of information your files can hold, but you are denied a directory listing; for this you must turn to DOS.

Windows Filer, which assumes that you're adent with a mouse, comes in a runtime Windows version for users who don't





Version 3.01 List Price: \$195 Requires: 512K RAM. two disk drives (hard disk recommended) Microsoft Windows DOS 2.0 or later.

In Short: Like its sibling program, Palantir Filer, Windows Filer is difficult to use, with cryptic documentation and no printer drivers. Not copy protected. OROLE 664 ON READERS

already own a copy of the Microsoft environment, and in a version that runs under Windows for those who do.

Neither program is easy to use. For starters, the DOS version's manual skips over some vital steps. On-line help is often puzzling and sketchy, and there's no tutorial to get you started. The Windows Filer manual and on-line help are a step up, but they aren't helpful enough. Moreover, Windows Filer has a tendency to crash: we tried a number of operations that locked the system (updating fields, for instance).

The DOS program also crashed when we tried importing data that should have been accepted. Another try was successful, but we would have preferred a lucid error message instead of the software's quirky behavior.

Windows Filer imports data from other formats better than the DOS version does. The Windows program accepts files in dBASE II and III formats (.DBF), standard data format (.SDF), and delimited format

ALPS PRIN HAVE THE

- PC Magazine

"...the speed, print quality, and other thoughtful features of the ALPS P2000...make this widecarriage 9-pin matrix printer my favorite new printer of the year."

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IT'S TIME YOU SAW THE ALPS.

(.TXT). Make sure you've filled out your data entry form precisely—not an easy task given the lack of prompts—or your file won't import correctly.

For data to import into the DOS-based Palantir Filer, each field must end in a carriage return, each record must have the same number of fields, and the fields must appear in the same order in each record. Further, you must first use a word processor or line editor to determine the number of fields in a record and to add a line at the beginning of the file (three backslashes followed by the number of fields in a record). Finally, you save the edited file using the .DMP extension and convert it into a Filer data file. It's not much easier to switch data among Palantir's own files: in both the DOS and Windows programs, you must first run an Unload function to divide the records into separate fields.

Windows Filer can't do true global updates. You must click the mouse to accept or deny each occurrence of the change you requested. The DOS version, however, does let you do a global update; without the time debit imposed by the Windows environment, it's somewhat faster than Windows Filer.

SHARED FLAWS To handle the PC
Labs math update test, a program must be
able to calculate a field and update it automatically. Both Palantir packages, however, make you create a new field to receive
the calculation and then print the new data
in a report—not really the same as a math
update to an existing field.

You must enter commands in the forms to tell the program about the format of your fields and the calculations you want to perform. Not only is the procedure too complex (more capable, easy-to-use programs give you a special screen to handle this information), but neither the manual nor the prompts adequately explains it. Furthermore, even though you must use field numbers in your command statements, and even though the program issues error statements that refer to field numbers, the program lists no numbers on-screen unless you enter them yourself. And to enter your fields in a data file or data ternal form, you must count the number of characters in each and use brackets to indicate the first and last characters in the field.

Reporting with either program requires a lot of effort for the disappointing results. And neither program offers printer drivers. Windows Filer does let you add graphics from Windows Paint or Draw to your data files, and it can copy and paste information from Windows Write.

For serious (or even fun) data filing and reporting, Palantir Filer and Windows Filer just don't make the grade. Fortunately, Palantir has a new product to crudabout: WinFile III—A Windows-driven database, not available in time for this issue's testing—which we hope will remedy some of the drawbacks of the previous programs.—Carol Olsen Day

PC-File Plus

PC-File Plus is the laters shareware database from Jim Button's ButtonWare. Derived from the carlier programs PC-File III and PC-File R, the new program seed to both and adds some new ones of its own. Its import, export, and report options make it a useful adjunct to a more powerful and complicaed relational database, but its ease of use also recommends PC-File Plus as the primary data management tool for home or office.

Starting out with PC-File Plus may be a problem for the database novice since the 234-page manual has neither a tutorial nor a beginner's guide. If you've used another database or entered tabular data into a spreadsheet, however, jump right inyou'll soon be comfortable. I'd like to see more examples of file and report design and better illustrations of the program's features, but otherwise the manual adequately describes the program's broad range of options. Further, PC-File Plus offers a "teach mode," invoked by Alt-T. that displays context-sensitive help automatically as the program moves from function to function. Pressing any key removes the help screen, which you can always invoke again by pressing Alt-H.

HERE ARE THE OPTIONS The opening menu lists 12 submenus, each selectable with a single character or function key. Data files can contain up to 70 fields, in either alphanumeric or number-only formats. Bear that limited choice in mind—it

may not suit all applications. PC-File Plus will place the field names on-screen in columns, or you can "paint" the screen yourself. You may run out of room before you run out of fields, since they all have to fit on one input form.

An interesting option is the text "superfield." which will allocate a maximum of 1.665 bytes for the first field (when there is only one), down to the minimum number of 145 bytes for the twentieth field. After the 21st record, each field can contain up to 60 characters. Che next update, promised for this spring, will employ multiple long-text fields in pop-up windows and will also draw graphs directly from your records.)

PC-File Plus can calculate stored fornulas as data is entered and can automatically insert the current date or increment a number. Once you set up a simple file relation, saving a record forces a look into another data file; for instance, you can set up the program so that you need only key in a salesman's initials and the program will type that person's name and commission

PC-File Plus finds records in one of two ways. You can browse your database by filling in a data-entry-style form and pressing F10. Or you can use a command string—for example, typing "Name = "SMITHY & (street = OAK | street = PNET)" produces anyone whose name sounds like "Smith," living on any street with "oak" or "pine" in its name.



DATA MANIPULATION



Filebase's data manipulation facilities are limited. You can update records with the screen above only after converting the file to a special fixed-length form. The field prompts are primitive, and you must update fields one at a time.



Q&A's ease of use extends even to the inexperienced user, and the task of indicating a sort level is no exception. You can sort on as many fields as you like, in ascending or descending order.



With Personal Decision Series—Data Edition, although you can define a lookup table during file creation, the length of the verification limits its usefulness.



Largely designed for maintaining bibliographical information, Sapana: Cardfile offers a sort routine only as a separate module. It is accessible through the main menu.

Searches are fast, since PC-File Plus maintains an index on the first two characters of every field. You can view the matching records one per screen or in a table with 20 displayed at once.

The program's report writer offers even more options. A few keystrokes will conjure up a tabular report from selected fields, or a paper copy of a filled-in input form. And you can program custom re-

ports yourself using the simple Report Command Language, or you can paint them with the full-screen editor. Laying out the report using the editor is easy, just type between the lines of instructions. You'll have total control over headers, footers, titles, data lines, and calculations to the program of the program of the program of processor with mail-merge; you merely enter your text and interspersel fields, and the

letters roll off your printer. You can print mailing labels in several styles with an external program provided by ButtonWare.

Al \$69.95, PC-File Plus is obviously a good deal, yet its versatility, speed, and ease of use make it worthy regardless of price. Though the manual won't welcome you with open arms, you'll appreciate this product every time you use it.

—Michael Friedlander

You can make communi



For years, the PC has helped users create documents that are full of impressive facts, figures, and ideas.

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Personal Decision Series—Data Edition

Data Edition, Version 2.0, the flat-file manager in IBM's Personal Decision Series, comes with an impressive interactive tutorial. When I'd finished it, I looked forward to putting the full package through its paces. Unfortunately, the tutorial was far more impressive than the program itself.

Creating a file in Data is simple. Fields may be in character, numeric, or date formats, as well as in some BASIC and Business BASIC numeric types. Data fills a screen table with your descriptions (20 characters) but displays only nine fields at any one time, so I could never view an entire record durine entry or edit.

You can specify a range for any field type and Data will check and validate it for you. However, the program gives you only 48 characters for specifying acceptable field contents. In addition, even though you must specify characters such as "()" or "-" or "/" if you want them to be required for a field, you must still key them in for each record. The contents of one record may be carried to the next, but you can set no default or automatic values. One particular annovance is Data's insistence that you tab from field to field-I'm accustomed to the Enter key, and every time I hit it I was carried forward to the next record or menu screen.



TOOTH PULLING Once the IBM program has your data, it seems somewhat reluctant to give back the information you've just entered. The user interface looks like something designed for a mouse and then programmed to use only the keyboard. Making Data do anything is like pulling teeth; the program has too many menus and demands too many keystrokes, going to the silly extreme of forcing you to put an X in a box to perform certain functions. The on-line help, however, is good, and Data warns you before allowing potential record loss. Also on the plus side, the library function will display descriptions of your data, query, report, and sort files. You can then copy, rename, or delete these or any DOS file. Data's opening menu can be customized to run keystroke-

saving mucros or external programs. Data left me rather cold in the input department, but I did find its ability to insert with BASIC cilintípium; Though you can only browse sequential BASIC findom files are treated like native Data files, providing a way to query, modify, and with the production of the property wing files generated by other applications. Conversely, it's a trivial task to write the BASIC code to access Data's induced files

and work with those. Data's report generator lets you link up to five files and connect tables through common indexed fields or through computations and statistics within the report itself. Those canabilities implied versatility. but I could create only the most unassuming tabular reports using Data alone. Only when this \$255 program is combined with other options in the Personal Decision Series does the promise I saw in the tutorial materialize. You'll need to buy Reports Plus (\$425) for sophisticated reporting, English Access (\$395) for plain-language queries. Plans Plus (\$185) for financial modeling and graphs, and Network Plus (\$395) to tie them all together on your network. Then the built-in import facility can gather data from .DIF, Filing Assistant. 1-2-3. dBASE II or III, ASCII, and BASIC files and transform it into useful documents.

ments.

If you limit your data input to uncomplicated tables, or if you want a gateway into external BASIC or mainframe records, then Data may serve your purpose.

Otherwise, look elsewhere for a friendlier, more comprehensive package. —Michael Friedlander

Personal Pearl

Personal Pearls off's Personal Pearls (59) a is like the toy ou christished as is like the toy ou christished as child—until something new came along. Personal Pearl was developed for CPM computers, it enjoyed tremendous popularity early on, ingigated to DOS, and lost market share to more-sophisticated competative tition. The program can still grind out the work you need it to do. But compared with the crop of new file managers introduced during the past 3 years, it comes up short in features. Rechildly, and enfortmenance.

Personal Pearl can create a database from the maximum of nine screens you "paint" using its forms designer. The field choices are limited to alpha, numeric, and date, and you may designate any field as either required or unique. Though dates are supposed to be checked for validity, I was able to make Personal Pearl digest 020000.

Through a straightforward linking process, Personal Perof can bring data from nine other files into the input form. Entering only a customer's code can make the program read in the current name, address, and billing data. Notably missing from the data entry options are default and carryover values, any type of range checking, validity checking on the lookups, and anything more than minimal input formatting.





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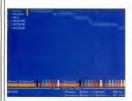
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SOME UNIQUE FEATURES



One of the trickiest things about Apollo is its use of buffers. You define the amount of on-line memory for a file by changing the size of the graphic bar on the buffer screen. Below the bar is the color chart for customicing program colors.



IBM's Filing Assistant is easy to use, shough the program is limited. It employs pop-up menus that overlay each other to guide you through the functions of each main menu selection.

Pearl's mediocre query functions foil any reasonable attempt to retrieve data. Unless a field is an indexed field, you cannot search on its contents. Worse yet, you can search only one field at a time, and no indexes on combined fields are allowed. These restrictions mean you may wind up looking for customers named Jones, for in-

FURTHER RESTRICTIONS Personal

stance, and finding them randomly in every state, or looking at the individual states and seeing everyone.

Personal Pearl cannot sort a file, either; it must index a field so that you can view it in sorted order. Moreover, every request for a new index requires installing the changes and rebuilding all indexes. That corresponds to a lot of waiting time

(as the test results indicate), especially if the file is as large as the PC Labs 5,000record sample.

Another disappointment is Personal Pearl's limited ability to share data with other programs. You can export data in ASCII form or to SuperCalc through the report generator. But Personal Pearl cannot import from any source without the ad-



Clear Cut allows you to use design elements (such as double lines and corner indicators) to draw boxes around areas of data in your record and report forms. The package gives you four sets of drafting characters to choose from.



Editor, a screen painter that allows you easily to draw lines and boxes in order to design relatively simple forms, diagrams, and charts.





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Personal Peart is a relic of the early years of personal computing, waiting for a badly needed revision. It offers too little performance for too much effort. The manual is overconcerned with minor details rather than how and why the program can serve us.

When compared with the choices of software available today, *Personal Pearl* looks like a gem that has lost its luster. —Michael Friedlander

PFS:Professional File

PFS:Professional File, a well-evolved, 2349 package from Software Publishing Corp. has roots stretching back to the September 1980 launching of the Personal Filing System for the Apple II. That program's IBM cousin, PFS:Pile, and its companion report generator, PFS:Report, were released in 1983; PFS:Professional File, introduced in September 1986, combines the features of both with several added enhancements. The result? A powerful.



that support a variety of relational and wild-

card operators. Not copy protected.

easy-to-use flat-file manager.

New users will easily become familiar with PFS:Professional File's powerful features by reading the 26-page "Quick Tour" chapter and by experimenting with the on-line, context-sensitive help (available by touching F1). If you already use PFS:Professional Write, its filing cousin's pull-down menu interface will seem like an old friend. Warning messages protect you from data loss when you're about to modify or delete records globally or when you try to exit without saving your last record. Additionally, pop-up messages and an activity indicator in the screen's upperright-hand comer tell you that the program is working. That can be reassuring when you're performing lengthy operations such as importing 5,000 records.

DATA ENTRY AND REYSION Developing your data entry screen is simple; you type the field name, followed by a colon, on the screen where you would like it on appear. When you've completed your design—which can be up to 32 screens long, with 100 fields per screen—you hit F10. If you later decide to change your layout the program will automatically recognize all of your existing data to the new format.

tormus "Professional File lets you specify up to 100 calculated Felis that above there sails of the four basic arithmetic operations up to 100 calculated Felis that 100 calculated with the four basic arithmetic operations on one or more other fields. (The program will not perform statistical or financial calculations.) To add directly the your data-base, you simply choose "Add" from the min menut, the form you designed appears on-screen, ready to accept data. And Critical Confession of the profession of the pro

name main menu also gives you searching and updating options. You can eview
from the control of the control of the control
menutes in sorted or the control of the control
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of the control of the control
of the control of the control
man of relational and wildered operators
lets you limit the records to be revised or
putated. For example, you could search a
mailing list for all records with the name of
smith, Jones, or Thomas whose ZIP codes
begin with 101. The global search-and
relate function used with the relational orplace function used with the relational

erators lets you update multiple records.

We did find one problem in the update, sequence if you change a field that is referenced in a calculated field, the program won't reactualate the result unless you type Ctrl-C before leaving the record. Thus you could, for example, change prices and quantities in an inventory database, yet leave the resulting total inventory value incorrect. Fortunately, there's an easy solution. For frequently performed functions, PFS-Professional File lets you define up to 35 keyboard macrost by simply define the programment of the control of the control

REPORTS Ease of report generation is a major strength of PFS:Professional File. You have a choice of four report types: crosstab reports, lists, mailing labels, or one record per page. A crosstab report can be generated with as few as five kevstrokes. The list report, probably the most useful, lets you generate reports with totals, subtotals, counts, and averages; it can report up to 64 columns (or 255 characters) for each record selected. The program uses the field names as column headings unless you specify otherwise. To generate a list report from the reports menu, just type a number next to each field name to indicate the order in which they are to appear, then specify the records using the same relational operators and wildcard characters used for updating records.

Two user-definable headers and footers can give your reports a professional look. You can preview your report on-screen and can save it to disk if you don't want to print it. Also, PFS.Professional File lest you import from and export to ASCII delimited files, PFS.Plan files, or the Lotus 12-3 format. You can save reports in a document format as well, for use with word processors.

If your needs can be served by a flat-file database, PFS-Professional File deserves your strong consideration. It's easy to learn and to use, yet if's also a powerful tool that can store, sort, retrieve, and report on up to 4MB of data. Software Publishing has a good name in the flat-file arrant, this program should make its reputation better than ever.

—Crait Pillson.



23 MILLION MEGABYTES AGO, DINOSAURS RULED THE EARTH.

IN THE BEGINNING, PC mass storage monsters clashed in brutal competition. Hard disks fought aggressively. though permanently burdened by steel and plastic encasements. Tape drives slithered to many victories, though slow and serial. And floppies multiplied wildly despite obvious weaknesses.

Then came dramatic changes. Users transformed the PC into a powerful workhorse. And with that transformation came new and complex data

storage needs. THE BERNOULLI BOX"SOLUTION was born with 10 and 20 megabyte remov-

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Graphics, CAD and desktoppublishing users discovered how to increase storage without constantly replacing or adding expensive hardware. And everyone with minis or mainframes could download files

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REPORTING



C.I.P.'s selection criteria screen is just one of the program's extensive reporting facilities. It allows you to specify the records you want for your database reports by using range value statements.



PFS:Professional File's crosstab report, which can be generated with five keystrokes, shows each cell as a percentage of a total. Little effort is required to switch from percentages to figures.



Pleuse's Quick List can create a quick-and-dirry report though it can't save the report definition. The error message "Cannot find fieldname: model" appears because the first letter was typed in lowercase rather than uppercase.

Please

The name Hayes means communications to most of us. But hidden among the Smartmodens and communications programs that carry the Hayes name is Please, a \$199 flat-file database program that Hayes has been selling since 1984.

Hayes developed Please for DOS 1.1 and has never revised it. The program knows nothing about subdirectories and has no way to read files located in other directories on your hard disk. On the plus

side, it fits entirely on a single floppy disk, using only a little over 300K bytes. Installing it is a simple matter of copying the program disk and sample data files to your hard disk or working floppy disk.

As you would expect of a program from Hayes, the Please documentation is clearly written and professionally produced. The manual consists primarily of a thorough tutorial that doubles as a reference guide. A separate "quick start" booklet eives installation instructions olus a whirl-

, | wind tour of the program.

Even if you're familiar with databases, taking the time to go through the tutorial is a must. Hayes uses its own terminology in so many places that you have to learn a new vocabulary. Instead of the standard mathematical signs, Please uses such mnemonics as L for less than, E for equal to, and G for erreter than.

Report generation is one of *Please*'s strengths. The Output Plan option is a menu-driven report definition feature. It



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■ FLAT-FILE DATABASES

offers a full range of sort, select, and other options in a format that even a database novice can quickly leam.

MENUS AND MISTAKES Please takes its marching orders primarily through menus, with the choices designated by function keys. The menu structure is designed so as to use as few levels of nested menus as possible. Three choices on the main menu, for example, are Produce a Quick List, Output Plan Support Menu, and Process an Output Plan. Another program might have grouped these three together into a single "report" choice. This approach saves keystrokes and makes finding the command you want more likely on one try.

Yet Please is often frustrating to use. It gives you no easy way to correct mistakes without retyping an entire line. If you make a mistake in typing a selection command, for example, in a report definition, the program will not only refuse to accept the command, it will erase the entire line.

For the PC Labs benchmark tests. Please managed most tasks easily. But it cannot search for records based on two search criteria. What is more troubling, on one search it kept insisting there was no match to a search key, when in fact a match existed.

Please is adequate but certainly not worth getting excited about. The lack of subdirectory support and a decent line editor is simply unacceptable in a program from a heavyweight like Hayes. If Hayes is serious about staving in the database market, it should consider revising the program. Please .- M. David Stone

Private Files

Sofistry's \$35 Private Files makes database creation a breeze. Once that honeymoon is over, though, you'll find your options rather limited. Modifying existing designs is possible, but pesky.

To create a database in Private Files, you select "Design or Modify a Field" and answer five refreshingly simple prompts: field name, number of characters, alpha or numeric, number of decimal places, and whether the field is keyed. Once defined, the field appears as a highlighted bar on-screen. You then position the field with the arrow keys and type an appropriate label. A simple yet effective draw function creates boxes or lines to help customize the database form. But the program offers no built-in checks on data integrity such as defined ranges, unique fields, case-sensitive fields, or date, time, or currency formats, so you must enter

your data with caution. The body of Private Files is driven entirely by function keys, with command choices displayed in the lower portion of the screen. The commands are no problem, but the program certainly shows its age, lacking point-and-shoot entry, pulldown menus, and user-friendly messages. For example, when you enter alpha data into a numeric field, you get a meaningless beep but no message. To choose a file from a directory you must type the entire filename. The F1 key, generally devoted to on-line help, is used in this program to "accept" a user-specified command. Private Files offers no way to move to the beginning or end of a record, and though it displays a status message listing the total number of records in the current database. it doesn't give you a "counter," which I find invaluable when navigating through a multifield database.

Private Files handles rudimentary searches and sorts well, albeit restrictively. The only fields it lets you search or sort are those you've designated as keyed (or indexed). That scheme limits your ability to view the database from different perspectives; to get another view you must copy the old database into a new, differently indexed file, something particularly troublesome if you work with floppies. The alternative? Keving every field from the outset-not recommended, since the program slows down on certain tasks as the number of indexed fields grows.

Once you've determined your keyed fields, Private Files lets you sort alphabetical or numerical data (in ascending order only) and will search for "exact match" text. When it can't find an exact match, the program offers the "next closest" match. Sometimes this is helpful-for instance, you could enter "E" and locate all employees whose last name begins with that letter-but often it leads you far afield. There's no facility for wildcards or conditional searches, either, so you're more apt to miss retrieving data. And the program is rigid regarding case: if you search for "Jones" but you've entered "JONES" in the database, forget it.

The program's report features are as easy to use as its other functions, if a bit more sophisticated. You can choose among three types of reports (columnar, text, or mailing labels) and print them to screen, disk, or printer, though you're limited to an 80-column format. You can specify a primary and secondary sort field,





5923 Peachtree Industrial Blvd. Norcross, GA 30092 (404) 441-1617 List Price: \$199 Requires: 128K RAM, two disk drives

DOS 1.10 or later In Short: This adequate menu-driven database program, from modern/communicat

giant Hayes, offers strong reporting features but is frustrating to use, it lucks subdirectory support and a capable line editor, and it can only do a search based on one criterion. Developed in 1984 for DOS 1.1, Please could use revision. Not copy protected.

REPORTING



When generating a report, Private Files supplies you with three formats: columns, text listings, and mailing labels. This initial report screen is followed by two others that allow you to specify the fields to be included, as well as the matching criteria and math functions.



RapidFile's flexible reporting capabilities constitute one of its greatest strengths. With the screen above, you can design your own custom report formats, complete with titles, headers, and footers.



Reflex: The Analyst's cross-tabulation feature is unusual for a flat-file DBMS. This crosstab display shows the average selling price for each record, broken out by make and model. Other crosstab functions appear in the pop-up window.

along with simple comparison criteria, including an "and/or" selection that allows the criteria to be combined or treated individually.

TRICKY BUSINESS The Private Files manual warms you to stay away from DOS if you want to protect the program's file structure. Before I'd read that warning, I used DOS to delete a hopelessly inaccurate file. Private Files didn't recognize the deletion: it displayed the filename in the di-

rectory, and when I tried to erase it using the Private Files delete function, I was informed that the file was "corrupted." The remedy was to move the file to a separate subdirectory and then delete it, using Private Files for both operations. Fine—but any program that tampers with my right to DOS disturbs me.

We reviewed Private Files with its mate, Private Files Plus (\$40), a utility that lets you split or merge two databases and import or export information in several

popular formats. The programs work together but are not integrated; you must exit the database, perform your Private Files Plus operation, and reload the main applidable, it is thin ascenties; for cause, and able, it is the ascenties; for cause, one of the PC Labs benchmark tests required performing and timing a global text update, something I couldn't do with Private Plus ables. Instead, I had to go into Private Files ables. Instead, I had to go into Private Files ables. The standard is a subset database of the records that required updating,

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■ FLAT-FILE DATABASES

a blank database, and a database with only two fields—the old text entry and the new one. Next, using Plus's Merge function, I matched the "new" text to the subset database. Then I worked backward to "remerge" the subset into the main database. Needless to say, I could hardly time this procedure, and I wasn't thrilled with such a roundabout approach.

Private Files is an adequate beginners' program, best used for simple database operations that don't require complex searchand-sort activity. In limited applications it performs well, for a price that won't crunch your private pocketbook.

-Robin Raskin

Q&A

Q: Does Symantec's Q&A compete as well as it did when it captured Editor's Choice honors last year and the year before (PC Magazine, August 1986 and January 27, 1987)?

A: Definitely. Time has not tamished the power or ease of use of this \$349 database package, which includes filing, reporting, word processing, and an "Intelligent Assistant" that accepts plain-English instructions.

Despite the intimidating look of its six program disks and 3-inch-thick manual, Q&A is easy to use. With the help of the slim Getting Started booklet, the 13-page Quick Reference Guide, and the keyboard template, even inexperienced users can be-

powerful search/sort functions, strong re-

Intelligent Assistant module accepts plain English commands. No copy protocard.

CIPICLE 070 TIN READER SERVICE

porting capabilities, and a macro facility. The

with Reference Guide, and the keyboard implate, even inexperienced users can be not supported to the support of the support of

gin designing and building databases and reports right away, with no blood, sweat, or tears. The disk-based natorial gives you a head start; interactive on-line help lends a hand when you need one; and the manual is a clear, comprehensive reference tool for becoming adept at Q&A's advanced features.

Everything about Q&A conveys quality and power. The package consists of five more about the package consists of property of the package consists of property of the package consists of property of the package and package an

INTELLIGENT ASSISTANT Symantec bills O&A as the database that understands English. The program's Intelligent Assistant module lets you use ordinary phrases and sentences to ask for help with certain activities, bypassing formal reporting and updating. After designing and building your database in the File module (where entering, importing, and changing data are easy tasks), you can ask the Intelligent Assistant to perform functions such as finding certain information, filling in or changing forms, answering yes-or-no questions, making calculations, or preparing and printing reports. Typical requests include "Add 10 percent to all list prices." "Show me all the parts for the Land Rover," and "Which managers have been more than 5 years on the job?"

The Intelligent Assistant will probably appeal most to first time or limited data-base users. Though it definitely makes accessing information easy, clarify jour needs and requests can take some time. It's a good way for those with more time than knowledge to learn and explore database capabilities. If Jour be bolder, more experienced, or more ambitious, you may want to bypass the Intelligent Assistant for the most part, using QAA's File module to handle your requests.

OTHER REMARKABLE MODULES
The File module has powerful, fast
searchupdate and sort functions. Besides
allowing indexed fields, Q&A lets you assign and use keywords to search for infor-

mation within fields. To retrieve records selectively, you enter restrictions for each field on Q&A's Retrieve Spec screen. You can ask the program to search for all the forms that mutch your specs, for values within a range, and for keywords. You can also have any number of sorts, in either according or descending or describing to the property of the property of

Customizing a file makes adding and updating records easier, faster, and more accurate. You can redefine your format values, restrict values to prevent mistakes in data entry, save time by telling Q&A to fill out fields with their most common values, define outsom help, change the record palette to highlight certain information, and so forth.

QAA's ability to program record forms gives you more control over your data and automates tasks like calculating fields or looking up values. You can enter programming statements into fields in the Programming tastements into fields in the Programming tastements with the programming tastements and text forms using QAA's built-in functions like date/time, math (sum, average, min, unc), context (add and update), number, and text for speedy processing of text values, and text for speedy processing of text values, with which QAA can then fill out information banks automation that the programming that the programmin

cally. The Report module provides you with the information you need in the form you want. Advanced features include handling column calculations, creating new columns derived from existing ones, and producing both detailed and summary reports. Choosing Utilities from the main menu allows you to import and export data, produce special effects with your printer, and use DOS Rename, Delete, or Copy with any file on your disk. And Q&A's Write module (not to be confused with O&A Write, a standalone word processor and PC Magazine Editor's Choice) could be the only word processing program many database users will ever need: it even checks your spelling.



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To save time and effort, you can crease and use automated macros for the File. Report, Write, and Intelligent Assistant modules. An added plus for many users will be Q&A's excellent relations with Lotus Pogram, returning automatically to Q&A when you exit the spreadsheet. You can also use Q&A to cell to your large to the property of the property of

For most database users, Version 2.00 (Ad offers a feast of data-handling tools at a reasonable price. But Symantec hasn't stopped three. Version 3.0, amounced in January, promises a 30 percent increase in speed, calmaced network support (includes property), promises a 30 percent increase in the support, password protection, faster teaching of the Intelligent Assistant through mems, merging of multiple databases, imported recovery and file searching, calculation of financial and statistical functions, and more—Carol Oben Day

Rajan

Rajan, a \$195 database program from Anil, is more steak than sizzle. If you want pop-up menus, exploding windows, and other snazzy details, you won't find them here. What you will find are more features then you might expect in a flat-file database, and some other pleasant surnrises.

The pleasant surprises include such things as screen painting for creating data entry forms, a label generator, a built-in text editor, the ability to create and print form letters, and a graphing function (alas, you must fill in the data manually rather than reading it automatically from your da-

tabase). Balancing these features are some minor annoyances. For example, you must start the program with the command PG RJN, but Anil could have easily supplied a batch file called RJN or RAJAN. Loading the program also includes a meaningless extra step as the program stops loading, announces it is loading, and waits for you to press the Enter key before continuing.

Once loaded, Rajan takes its orders

from a mixture of full-word menus, function key commands, and a cryptic "shorthand" menu. The full-word menus are fully 1-2-3-like, letting you move through the choices and see a description of each. The function key commands are consistent

throughout the program.
Unfortunately, the shorthand menu may be a problem. It functions much like the full-word menus. You can move a command. The full word menus are the full word menus. You can move a command. But a menu that looks like al-publest soom (peoficially, n / N B C D' DOUPI/DSEU/UN/FI/M PR/S/SS/ X, XSEL/UU/NO/W Will intimidate many users. And because this menu is Rogins' statument, which you use to add, delete, search for, or edit records, Rogins is important to the common of the control of the co

On the PC Labs tests, Rajam handled most important database functions easily, usually offering features beyond those we tested. For example, Rajam can sort on any field and write the result to a new file, giving you the benefits of both a permanent sort and a temporary sort. And unlike some flat-file databases, Rajam has no trouble globally changing a text field or numeric field, although it doesn't tell you how many records it has changed.

On the minus side, Rajan will not automatically index data while importing, and it does not give you complete control over which fields to subtotal on a report.

The PC Labs tests also turned up two

The FC Labs tests also turned up two bugs. If you try sorting data while exporting a file, Rajan balks. According to an Anil representative, this bug has already been fixed in the next treat this review. For gram (Version 5.2), which should be available by the time you read this review. For any the sorting the sorting of the sorting of the available in the sorting of the sorting of the available in the sorting of the sorting of the available in the sorting of th

Anil has no toll-free number for support, but technical support is free for registered users. More important, the support is knowledgeable; you get immediate, accurate answers to your questions.

In the version provided for review, Rajan is promising, but wanting. The combination of bugs, cryptic prompts, and general lack of polish is just too much for the program's good points to overcome. Still, Rajan has promise, and future versions should be worth a look.—M. David Stone

RapidFile

Ashton-Tate's RapidFile is like a fine thoroughbred. It's fast, it's powerful, and it's from the same champion stock as dBASE III Plus. And although RapidFile (\$295) is easy enough to control along the straightaway, its high-strung nature makes it tricky to handle around unexpected bends.

tricky to handle around unexpected bends. For flat-out speed, Rapidal' lie holds is own with the best of the programs from the program of the program of the property produced by the property of the property profile gallops shead of many of its peers. Its greatest strength is in its extensive the proting capabilities. Predefined report formats include tables, forms, a split screen with both tables and forms, and mailing labels. The Custom Report writer is on hand when you want to design your own report layouts, while the Quick Report writer gives you the tooks to fashion a relatively gives you the tooks to fashion a relatively also save and reuse, your report layouts with their circlinal files.

RapidFile's memo writer and form writer offer minimal but adequate word processing capabilities. The memo writer (into which you can merge any field in a record) is designed for writing single docu-



ERASE. ARE YOU SURE?

Levery computer user faces this question in some form each day. To erase or not to erase. To seve or not to save, when saving mean overwriting the previous version of a file. If you answer yes and you're wrong, countless hours of work will be wiped out by a single keysted. And there won't be anything you can do about it, unless you're becked up.

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Maynisteam's pull-down menus make it remarkably easy to back up, restore, assign names to frequently backed-up groups of files, select optional password protection, and more! And context-sensitive, on-screen help is just a keystroke away.

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■ FLAT-FILE DATABASES

ments, the form letter (time which you can merge any field in a database) for writing series of letters. Definitely on the up side series of letters. Definitely on the up side saurus, both from Merriam-Webster and encipients of soil marks in "Clonkers & Coolinde." Spelling Checkers Get Better! (PC Magazine, Cotober 13, 1987). On the down side, the memo and form writers can hold only 64K.

Another power-adding feature is the macro capability, with which you can record and edit keystrokes. In addition, sophisticated string functions, which use a syntax similar to that of BASIC, can carry data over from previous records, automatically increment flesks, convert date formats, and require a specific value for a field.

RapidFile's user interface has both a five-item moving-bar menu and pull-down menus. By pressing Crrl and the Backslash key you can convert the interface to a Lotus 1-2-3-style moving-bar menu. A one-line explanation pops up when you choose many of the commands.

Pressing F1 brings up the program's context-sensitive help. Like its manual, RapidFile's help covers all the basics but lacks sufficient examples. Although both list, for example, all the string functions and their uses, they lack adequate exam-



features are more difficult to use than they

should be. Not copy protected.

ples of how to structure the commands with the requisite quotation marks, parentheses, and brackets. As a result, the syn-

tax can be daunting to strangers to BASIC. Using RapidFile for some operations is relatively easy, but other procedures are convoluted. Fortunately, a number of shortcuts can speed some operations. For instance, to sort on one field, you can go to the moving-bar menu, enter the Record command, and tell the program to Order.

In flexibility and power, RapidFile gallops ahead of many of its peers.

When the list of field names pops up, you specify the field to use to Order (sort) the records and whether to sort in ascending or descending order. Or you can take the shortcut: with the cursor on the sort field. simply press Ctrl-O and choose the direction of the sort.

Creating a field requires some forethought. From the File Selection menu option, the program prompts you to define each field as a text, numeric, date, calculated, or report field. Report fields enable you to generate reports that use data in related fields to create subtotals, totals, averages, max, min, and so forth, but using the report fields can be confusing.

FAST AND SLOW TRACKS The report we produced for the benchmark tests, for example, required creating report fields to subtotal the selling price of certain car parts, grouped according to the make of car. We first had to use the Modify Structure option in the File menu to change the SellPrice field in the database from a numeric to a calculated field. Next we had to create a new field, entitled Subtotal, and define it as a report field. RapidFile prompted for the type of calculation (subtotal) and queried whether it was for all or a group of records (all), which field to subtotal (SellPrice), and which field to use as a basis for the subtotal (Make)

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■ FLAT-FILE DATABASES

The next step was to return to the File ment to select the Record command and sort the database by the Make field. Then we had to select another menu option to calculate the field. Finally the subtotals appeared. The manual should include a sophisticated sample report, labeled with step-by-step instructions for performing each operation, to make this effort easier and less time-consuming.

RapidFile's shortcut method for creating the same report is to sacrifice custom report definition and use the Quick Report layout. Using the predefined format, you simply sort on the Make field, type ST for subtotal in the SellPrice field, and voila, you're finished.

RapidFile can import dBASE, PFSFile, 1-23, and comma-delimited ASCII files easily. Sorting and locating files are also relatively straightforward, And extracting by printing to RAMdisk poses no real problems, but we were unable to remove the field titles and the various horizontal and vertical format lines. Althoush elboally changing a numeric

field is easy, globally changing a text field is another story. To change the text of certain fields, for example, you have two options, both less than ideal. The first is to use a two-step process that requires a number of keystrokes. The second, also a two-step process, involves fewer keystrokes but necessitates writing a string expression.

RapidFile crosses the finish line with novemorthy, sophisticated features, particularly in its predefined reports. But you'll need patience and understanding to finesse functionality from some of RapidFile's powerful features and keep this racehorse on track.—Cheryl J. Godberg

Reflex: The Analyst Reflex: The Analyst is a database that acts

like a spreadsheet. It's one of the low-cost (\$149,95) productivity packages from Borland, better known for its pop-up Side-Kick and low-cost Turbo series of programming languages. And although Reflex is a flat-file database and thus cannot link files, it can do some things with your data that few other flat-file programs can.

Like a spreadsheet, Reflex must hold all your data in RAM, Like Lotus 1-2-3, it can take advantage of LIM expanded memory to handle larger databases. But if you're using that much data, you'll probably want to use a disk-based system. With conventional memory (640K), Reflex choked

Like a spreadsheet, Reflex can handle logical,

numeric, and datemanipulation functions.

when importing the PC Labs 5,000-record test file; it accepted the first 3,200 records but later ran out of memory on some operations.

Like a spreadsheet, Reflex performs RAM-based data operations blindingly fast. The program imported the PC Labs test files about as fast as the computer could read the disk. It took less than a seond to perform most of the benchmark tests on the 50-record file, even when reaching the goal required two or three

Like a spreadsheet, Reflex can handle a wide range of logical, numeric, and datemanipulation functions. One feature less you fill a range of fields with random or sequential values. You can even create a datables to true for "wheth if" calculations.

ubuse to use for "what if" calculations. But unlike most spreadsheets. Reflex makes it easy to set up fields and data entry cell resures, complete with some basic data entry cell features. Reflex also differs from most spreadsheets in giving you easy-aperform record selection and sorting. You may be the selection and sorting the selection of th

So Reflex leaves spreadsheets and most database programs in the dust. It can make graphs of its data or sections of data. It can summarize data on the fly, showing consolidated results of all occurrences of a given field value. It can create a cross-tabulation, showing the number of occurrences of pairs of field values. In the samole PC of pairs of field values. In the samole PC

Labs test files, for example, Reflex was able to show the number of transactions for each combination of the Make and Model fields. It displayed the information in a table with the Makes across the top and the Models listed down the left side.

TRANSLATIONS AND LIMITATIONS REPERT IN TRANSLATIONS AND LIMITATIONS REPERT IN THE REPORT IN THE REPO

labels). The wonder is that Reflex can even handle a file that uses all three formats. If installed for an EGA, Reflex puts more than 30 lines of data on the screen. The screen looks a little different, but on the NEC MultiSync monitor the characters are clear and entirely legible.

Reflex's mouse support works well, and using a mouse is a significant help in many tasks. But the mouse feature is not well integrated. In too many instances you





Reflex: The Analyst, Version 1.1 Borland International Inc 4585 Scotts Vulley Dr. Scotts Valley. CA 95006 (800) 543-7543 (408) 438-8400

Regulares 2968, R.M.1, two tols div uses thard dist recommended. DOS 2.0 or later. In Short: Like as precalabere, Reflect holds all or district and the state of the short of

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■ FLAT-FILE DATABASES

must abandon the mouse to scroll the display or to pop up a look-up list of available options.

The manual includes comprehensive reference material, a good tutorial linked to sample files on the disk, and an excellent index that never failed to point us in the right direction.

Reflex is limited by its practical capacity. At more than one point in the testing, the program warned us that we were almost out of memory. On one occasion, we hit the limit and were forced to go directly to DOS. Fortunately, Reflex gave us the chance to save the partially processed file before leaving.

tendre leaving.

Another limitation is the program's modular structure. The report writer is excellent, but to use it you must leave the modern program and the property of the program and the program and the program and the program for the program for the program for this tender to the program would be handler to use on hard disk systems if the different modules were linked.

inhed. In the two major restrictions of timed capacity and spenter modules, Reflex's speed, power, and flexibility mater in acceptable value. The limited capacity is offset by the fact that 1/2-30 users will lead right at home with Reflex's beyline menu (aithough it also has drop-blown 1/2-3). So if you've gone the limit with 1/2-3's database functions and are looking of a better solution, take a look at the limit with 1/2-3's database functions and are looking the program. Reflex: The Analyst ranks as a great databases.—Alfred Poor

Sapana: Cardfile

"Use the right tool for the right job." This ageless advice applies to computer programs as well, which explains why an ancient relic like Sapana: Cardfile, a \$195 program from Sapana Micro Software, may still have a place in someone's software toolkit.

Cardfile is indeed ancient. A quick check of the single distribution disk reveals that all the program and sample files could fit on a DOS 1.1 single-sided disk. Even more telling is the date stamp on the main program file: November 13, 1984. The

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program has not changed in more than three years, and it shows.

Carifile could not even begin to ascomplish many of the PC Labs time to complish many of the PC Labs time to supply totals for the test report, let alone subtoxis. It cannot index, and the only available sort routine is a separate program. Data entry is strictly on a line-byline basis; you cannot reverse to correct a previous field while adding records. Also, you must update fields singly; the program does not do global updates.

Key assignments are funky at best. Some of the cursor control keys and the Del key produce characters instead of per-

forming their more-usual functions. What is Cardfile good for, and why would anyone pay \$195 for it? Cardfile is alargely declicated to maintaining bibliographical information. It comes with a template that prompts for title, author, periodical, topic, publication date, and so on. The program also accepts up to 255 60-character lines of abstract information (long text).

The program is no modern text database, though. You enter abstracts by using a line editor, and Cardfile lacks such luxuries as word wrap and fancy text formatting. You can, however, search for words within the abstract

Another plus is that three of the first six fields are lookup fields. You can enter up to 255 different code values for each one. While you're entering data, you can recall

the codes one at a time, to search for any whose number you cannot remember.

whose number you cannot remember. Although you can modify the templaces to hold data other than periodical references, this is not easy to do. The manual advises you to use EDLIN to modify a copy of the configuration file. You can change the names but not the types of the first six fields in the definition, and you can have no more than 24 fields in all. Only the company of the configuration file. You want to the control of the control o

Not everyone wants to become a programmer or a duabuse expert, which is why Spanus Cardiffer probably has a small but loyal following. If you want a system that is set up to track bibliographic information its way, straight out of the box, you may find this one satisfactory. On the other hand, if you want to set up your own fits extructures or manipulate data your own way, Sapana: Cardfile is not for you.—Altred Poor

Uni-File

The heritage of Uni-File is the vertical software market. The \$149 program from Univair originally was a user-access and file-handling module for programs designed for specific applications, as in insurance agencies and legal offices. While Uni-File may shine brightly for preconfigured filing systems, it pales when compared with other standalone programs.

Although Uni-File is a flat-file program, it has two helpful features for working with other files. When you define a field, you can specify that the contents come from a field in another specified file. You can also set any filed to post its contents to another file. Both of these features make Uni-File a helpful tool for transactional applications.

Uni-File works with both floppy and hard disk drive systems, but the installation directions are complete only for floppy drive systems. To install the program on a hard disk, you simply copy the program files onto the desired subdirectory. Since Uni-File doesn't support subdirectories, you have to perform subdirectories, you have to perform subdirectories,

changes through DOS. After you've copied the files, you complete the installation by running the Univair Set-Up program and answering prompted questions about your system. The separate set-up manual is

reasonably helpful.

Uni-File comes with a demo disk that scrives as a tutorial. The demo is not interactive; you press the PgDn key to advance screens.

Despite Uni-File's general ease of use, you must go through the somewhat cumbersome menu hierarchy to accomplish all tasks. The program uses neither keyboard function keys nor Ctrl-key or Alt-key command combinations.

AWKWARDNESS Grasping Univairs's sometimes nonstandar ferminology is more difficult than learning to use the program. For example, sorting with fuln-File means selecting records based on particular criteria, not reodering records assed on particular criteria, not reodering records. The manual—S8 pages with no index—is reasonably helpith, but it's not great. Organized by program functions, it offers few details and little explanation.

Creating a file with Uni-File is a twostep process. First you define a prompt screen, using coordinates for field prompts. Next you define the fields themselves, specifying data origin, type, length, and whether to post the data to an



ing order, and cannot import even ASCII

files. Not copy protected.



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■ FLAT-FILE DATABASES



• Q&A

For a large percentage of PC issers, flat flit databases made sense because flev fe eather to use than dBASE and Kbase. And the base and Kbase and aparying features you once found only in relational databases. Flat flits are also more affordable: smert prices for the DBMS packages mentioned below range from \$150 to \$200. dBASE III Plus repically sells for \$400.

Q&A caused seat in this field for a set in this field for

its ease of use and power. Not only is Q&A simple to operate, but Symantee has included a program culled littelligent Assistant, which allows you to use ordnary phrases and sentences to specify reports and update records. At 3549, the Q&A package comes chock-full of features—including numerous field artivate characteristics, report adminitor methods, a query language and edimethods. tor, search parameters, and the copacity to import and export all major file formusts. It even includes a stightly abridged version of Symanter's Q&A Nittee-with spelling checker—which PC Magazine selected as the Editor's Choice in our special word processing issue February 29, 1988). Many users will find Q&A the only toot they'll need.

Honorable mention goes to Sofinal File. Though not as feature-rich as our editor's choice, the PFS; offering is very easy to use and completed all our benchmark tests with flying colors. Ease of report generation is a particular strength.

If you want to use 1-2-3 as your database, get Lotus's HAL and Report Writer. Or take a look at the database add-ins that we reviewed in Living with Lotus, *PC Magazine, January 26, 1988.

external file. Uni File supports string, numeric, and date field types.

After you define the fields, you specify the index field, which can be any combination of 30 characters from as many fields as you wish. It's a simple matter to change both the file structure and the index.

Adding records is similar to using a line editor. After you enter the contenss of one field, you cannot go back to change the entry until you have gone through left fields. At the end of a record, the program asks you to verify your entries at the pair you can go back through each field to make changes. This procedure works, but it's cumbersome. In addition, you cannot import ASCII files or any other files not created in Un-File.

After you've entered a record, you can use the Revise function to examine or alter record contents. You can search records in index order or in the order in which they were entered. You can also specify wheth-

er records have a specific field match or fall within a data range.

To define report formats, you use menus and page coordinates—an awk-ward but workable method. Since you can define and save up to 99 report formats, it's easy to set up standard reports that you can later call up by number. The program has no special primer configurations, as it encreates only valian ASCII lext reports.

Uni-File lets you use a program access code, as well as three levels of user access by passwords. It also includes an onscreen calculator and a typewriter mode to let you send characters directly from the keyboard to a printer.

Unfortunately, Uni-File's awkward data entry, lack of importing and sorting, restriction of indexes to ascending order only, and failure to offer many features found in competing programs make it a poor choice for personal or professional use—Bruce Brown

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THE TRANSFORMERS:

80386-based turbo boards from Applied Reasoning, Intel, and Quadram provide highperformance brain transplants that give old XTs a new lease on life.

386-BASED TURBO BOARDS FOR XTs

long the highway of progress, the tollbooths are frustratingly close together. Inevitably you pay a high price for some technological marvel and before you get a chance to shift into high gear, the next toll-taker already has his hand out.

Case in point: your PC. Microprocessor designations have fallen by the wayside faster than mileposts on the interstate. From the 8088, we've passed the 8086 and 80286, and now we are cruising through the territory of the 80386.

THE SOTA SOLUTION

The goal of the typical turbo board is a combination of speed and continued compatibility with the hardware and software you have today. When you plug in a turbo, you normally want everything to work just as before—but faster.

OS'2 and other advanced operating environments expect more than that. This software has been written for the AT revironment, and it crashes into a wall of incompatibility when it encounters the limited resources of a host PC. Fewer DMA (Direct Memory Access) channels, few interrupts, and a different bus structure all conspire against the proper operation of such software.

SOTA Technology has designed its MotherCard 5.0 to reconcile the differences between PC and AT. Slide this 80286-based turbo board into an XT or PC (one that has had its power supply upgraded to handle its additional 15-wat demands), and you can choose to give your favorite software an AT and a PC to main

A hybrid replacement-style/coprocessor turbo similar to the Inboard 386/PC and Quad386/XT, the MotherCard 5.0 requires you to pro vol your 8088 and pop a cable in its place. The MotherCard 5.0 differs in that you give your dd 8088 a new home on the turbo board so that you can switch back to it when compatibility demands a regression. Unlike the PC-EIerator 386 coprocessor, however, the mode change requires a reboot, While the MotherCard 5.0 provides

White the Wotter-Lad 2-5 provides a MB of wide bus (16-bit in this case) RAM for its turbo processer, it differs from all other turbos in having a special bus-converter chip that makes your PC expansion bus look like that of an AT during 10 operations. The VLSI chip converts every 16-bit bus requirement from the 80286 microprocessor into its converte every 16-bit bus requirement from the 80286 microprocessor into its could be supported by the support of the Wotter-Lad 2-bit bus even the support of the Wotter-Lad 2-bit bus even the work of the work of the Wotter-Lad 2-bit bus even the work of the work of the Wotter-Lad 2-bit bus even the work of t

5.0 is split 640K for DOS, 320K expanded, although you can optionally assign 704K to DOS. Up to 640K of the RAM in your old PC can be used for utilities such as the RAM disk, disk cache, and print spooler that are supplied with the MotherCard 5.0.

One megabyte of RAM fits on-board in the guise of 256K SIMMs; 1 or 2 more megabytes fit on a daughtercard that makes the extra memory modules project perpendicular to the MotherCard 5.0, swelling it into a one-and-a-half-slot package containing up to 4MB RAM. The board also supports a 5., 8-, or 10-MHz 8028 rumeric corporcessor.

Once you've added the MotherCard 5.0 to your PC, your software will think (and run) as if it's in an AT—perhaps even faster if you disregard video and disk I/O, because both 8- and 10-MHz, one- and zero-wait-state versions of the

SOTA Technology MotherCard 5.0 are available.

Alas, even adding the MotherCard 50 won't help a basic OS/2 compatibility problem. You still can't boot your PC or XT with a high-density floppy disk, so you cannot get current versions of IBM's new operating system running. Nor will be MotherCard 5.0 handle multitasking systems designed for the 80386 micro-processor.

All in all, the MotherCard 5.0 rates as a clever product with uncertain prospects, a bravura engineering aberration. Consider it another turbo alternative, not a universal curative.—Winn L. Rosch



In this land of accelerating obsolescence, the turbo board sounds like a godsend, a passpot to higher performance for the parsimonious, an add-in that cuts the cost of keeping up with technology. Slide a turbo board into your old computer, and you get performance on a par with today's latest machines at a fraction of the price of a new PC.

Turbo boards based on the 80386 microprocessor bring even bigger benefits, allowing you to pack all the advanced features of the latest Intel chip in more-mundane machines. Among the blessings are true hardware-based multitasking, the

ability to run more than one ordinary DOS program at a time (something OS/2 alone can't do for you), and superior memory management.

The three 80386-based turbo boards examind here promise those possibilities and more. Each will upgrade your 8088based computer to approximately the performance standard set by Compaq's original 16-MHz Deskpro 386. Because they are expansion boards, you can just slide them into your computer.

Priced at slightly under \$1,000, the Intel Inboard 386/PC, the Quadram Quad386XT, and the Applied Reasoning

PC-Elevator 386 look to be the most inexpensive ways to enter the 80386 operating environment.

TWIN TURBO TECHNIQUES To cope with design difficulties, engineers radiationally have had two techniques of implementing turbo boards: the microsoroboard. The replacement and the coponers board. The replacement processor board may be requires that you pop out the naive microprocessor of your computer system and plug in a cable to the turbo board in its stead. The coprocessors style of furbo board puts what amounts to an entire computer but what amounts to an entire computer

on an expansion board and operates it in tandem with the microprocessor already in your system—the powerful chip handling the heavyweight calculations, the old processor handling routine housekeeping chours.

Each strategy has its own advantages and disadvantages. While the replacement-style board is more difficult to install, it mates better with the existing resources in your computer because it connects directly to them. However, because replacement-style boards generally take advantage of the memory already in your system and use caching techniques to improve performance, the speed boost they give is relatively modest.

uney give is retained mouest. Coprocessor boards trade installation simplicity for software complexity and require some programming strategy to make input/output (I/O) operations run smooth-by. But because they are essentially self-contained, coprocessor boards can be optimized for maximum performance consistent with the microprocessor that they use.

Of the boards examined here, the PC-Elevator 386 is the only one that can be classified as a traditional coprocessor board. Both the Intel Inboard 386/PC and Quadram Quad386XT rate as hybrids that combine many of the best features of both technologies.

As with replacement processor boards, the Intel and Quadram boards' processors appear to your system to be just like the 8088 microprocessor that it expects to find in its system board socket. But instead of using memory caching, both of these turbos can substitute their own high-speed memory for the native RAM of your PC, just as coprocessor-style turbos do. This power is derived from the memory-remapping ability of the 80386, a talent lacking in the 80286 microprocessor used in earlier turbo boards. Like coprocessors, then, these boards keep calculations and memory moves in their own fast 32-bit RAM and never have to squeeze the bytes involved through the narrow 8-bit confines of your system's native memory.

Input/output operations aren't so blessed, however. The I/O devices that the turbo board microprocessor needs to access—for instance, the video display or a hard disk drive—remain connected to the host computer's expansion bus. No turbo board trick can spread your computer's bus wider than its 8-bit design.

CARD CHEATS Turbo board designers are clever enough to know that if they can't beat the system, at least they can cheat. Using some clever programming strategies, they can shave milliseconds off the time required by many I/O operations.

Only a fraction of the time consumed by an I/O operation is actually devoted to moving data. The rest is overhead required to get the bits ready to move a their port of departure or to retrieve them from their point of arrival. Because this overhead is mostly made from BIOS routines, it can be reduced by relocating the instructions from the slow, 8-bit ROM chips of the host PC into the quick 32-bit RAM of the turbo

board.

Moving of data to and from disks, particularly hard disks, is not really burdered by BIOS overhead and suffers more from by BIOS overhead and suffers more from Although nothing short of radical system board surgery, can cure these ailmens, other software tricks can help overcome the handicages. In particular, disk caching can make a disk seem more responsive, at least on data transfers mediated by DOS. With the Applied Research of the control of the production of the products of the products of the params with their products.

Not all disk operations will be improved by caching, so it's not a panaca. Programs that directly manipulate disk hardware to pick up extra speed usually won't benefit from caching. Disk I/O remains the one major shortfall of turbocharging, rather than investing in a newer, wide-bus computer.

ROADBLOCK Access to powerful operating systems and environments may be more important to you than the outright performance increase that the turbo and grants. Although hardly a force on the market today, OSZ pomines big things (like programs and data structures larger than DGS's 600K limit will accommodate than DGS's 600K limit will accommotate than DGS's 600K limit will accommo to the grant between the programmor and the grant between the grant be OS/2 nor Windows/386 will run on any of these 80386-based turbo boards for PCs. The incompatibilities are manifold. With OS/2, the most basic problem is the simple matter of loading the operating system.

The situation with Windows/386 is similar but more promising. The makers of all of these turbo boards told PC Magazine that they were working on drivers for Windows/386. For now, all of these boards will run Quarterdeck's DESQview 2.0, which will allow you to exploit much of the power of the 80386.

Be realistic in your approach to a turbo board, and you won't be disappointed. These products will breathe new life into a sluggish PC. By cutting down the waiting during your use of your PC, these boards can pay for the

APPLIED REASONING CORP. PC-Elevator 386

After years of specialization in high-performance 80,286-based coprocessor boards, Applied Reasoning has added the PC-Elevator 366 at the top of its product line. The new \$1,595 product (announced at Fall Comdex 1987) is a true coprocessor that puts a second independent computer inside its host and requires no more in the way of hardware installation than a simple slide-in.

Besides easy installation, a big benefit of the coprocessor approach is compatibility. The PC-Elevator 386 runs not only on PCs and XTs but also on ATs and most clones, no matter what the native processor. All it requires is a working MS-DOS machine, a single full-length, XT-height, 8-bit expansion slot, and about 10 watts of

In addition, you can add multiple PC-Elevators to a single PC chassis. According to Applied Reasoning, such an installation opens immense possibilities for parallel processing (for which you would have to develop your own software).

The PC-Elevator 386 operates with a ping-pong approach to turbocharging. You boot up your computer as usual with its normal microprocessor, then execute a program called UP that shifts into high gear. You can bounce back down to your PC's own processor whenever you like simply by running another utility, DOWN, at the DOS promot.

Both normal and turbo operations have independent DOS prompts and entirely separate DOS environments (including logged disks, active paths, other SET conditions, and background processes) because each runs its own copy of DOS and each operates independently—well, almost. The 80386 processor uses the original processor to mediate I/O operations.

When you shift up for the first time, your system reboots to initialize the 80386, then reloads DOS. As with any boot-up, it reads both CONFIG.SYS and AUTOEXEC BAT. Applied Reasoning includes a special program that set different error levels for upstairs and downstairs operations, so you can construct conditional batch files (including AUTOEXEC) to set different prompts and run different terminate-and-stay-resident programs in the two scenarie environments.

The standard memory of the PC-Elevator 386 includes IMB, of which 640K is available for DOS programs. The balance can be put to work as either EMS expanded, protected-mode extended memory, a RAMdisk, a disk cache, or any division between the four. Applied Reasoning supplies the necessary device drivers as well as a setup utility to make everything work.

New software, available only in a betatest version at the time of this review, allows you to assign any memory in the combined PC-Elevator 386/nost PC system to almost any memory mode. You can even map the system board memory of





The \$1,595 Applied Reasoning PC-Elevator 386 occupies one expansion slot and includes a 16-MHz 80386 processor and IMB of RAM. Its processing performance is very good, but slowness in disk I/O and direct video writes makes it better suited for calculation than presentation.

your PC into the extended addressing area of the 80386 (you need only reserve space for DOS plus 30K for overhead from the system board memory so you can run the UP utility). The only exception is that system board RAM cannot be assigned to the expanded memory area.

The 80386 microprocessor on the PClewator operates at 16 MHz with Pcuway interleaved memory. According to Appleld Resconing, the result is zero-waitstate operation. In truth, four banks of nine 4 by 64-kiboli, 100 nanosecond dynamic RAM chips may force a wait state in memtry cycling perhaps 25 percent of the time. But (again according to Applied Resoning) other factors predominate at such times that wait states would come into play, mitigazing beit performance effect.

While the explanation is interesting, the performance of the board on processor-in-tensive chores is more enlightening. The PC-Elevator 386 does, in fact, deliver the best performance among these turbos, in many ways on a par with the performance of a Compaq Deskpro 386.

on disk. I/O, even with disk caching enabled, and it falls apart on video operations. Although video displays are admirably smooth, completely free from the jerkiness endemic to most coprocessor turbos, the PC-Elevator 386 system is laggardly indeed in direct video writes. In other words, the PC-Elevator 386 is a product for heavyweight calculations, not flashy video displays.

To speed such numeric operations further, you can fill the empty socket on the PC-Elevator 386 with an 80387 coprocessor that operates at the full 16-MHz board speed.

A three-row header allows for memory expansion. 2MB (81,095) and 4MB (81,995) daughtercards are available. Three of the latter can be installed to push the total RAM available to the PC-Elevator 386 to 13MB, the most generous among this trio of turbos.

Overall, the design of the PC-Elevator 386 hardware rates as excellent. A noteworthy feature is that all integrated circuits on the board—memory, microprocessor, support chips—are socketed.



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SOFTWARE SETUP Applied Reasoning has done a very good job of untangling the snarls of setting up the software needed by a coprocessor system. The entire software installation process is controlled by a single menu system that does all the file copying for you and even automatically makes the correct entries in CON-FIG SVS

Because the PC-Elevator 386 makes do with the BIOS that you already have, it rates as very compatible with ordinary DOS applications (including BASIC). It currently does not support OS/2, Windows/386, or 80386 versions of UNIX/Xenix. While Applied Reasoning is working on compatibility for all three, no firm date of availability has been set for drivers for the first two. SCO Xenix support is supposed to be available by the time this article appears in print.

INTEL CORP.

Inboard 386/PC

In designing the Inboard 386/PC, engineers at Intel Corp. zeroed in on the three areas of performance that most determine throughout-and where the PC and XT are most sluglike; video, disk I/O, and the microprocessor. They broke the first bottleneck by rewriting video BIOS calls and moving the 8-bit ROM-based instructions into fast 32-bit RAM memory. They speeded the second with disk-caching software. The third required the \$995 80386based Inboard 386/PC itself. The result is a well-integrated, fast system that offers an order of magnitude of performance enhancement over a stock PC

Besides an 80386 operating at 16 MHz, IMB of dynamic RAM is standard equipment on the Inboard 386/PC, appearing in the guise of four soldered-down banks of nine 120-nanosecond, 256-kilobit chips, A daughtercard that accommodates up to 2MB is available both fully loaded (for \$1,145) and with LMB installed (at \$645).

To further enhance performance, a socket is available for adding an 80387 numeric coprocessor that operates at the full I6-MHz speed of the 80386. The chip adds \$795 to the price of the board.

The 120-ns, rating of the memory chips forces two wait states, limiting the Inboard 386/PC to about 80 percent of the calculat-

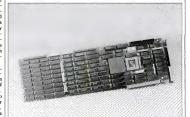


Summary of Features

	Inboard 386/PC \$995	Quad386XT \$995	PC-Elevator 386 \$1,595	
Microprocessor	80386	80386	80386	۰
Board style	Hybrid	Hybrid	Coprocessor	
Clock speed (MHz)	16	16	16	
Walt states	0	1	0	
On-board memory	1MB	1MB	1MB	•
Memory expansion	Up to 8MB	Up to 9MB	Up to 13MB	
Coprocessor	80387	80287, 80387, Weltek 1167	80387	
OS/2 competibility	No	No	No	

ing throughput of the original 16-MHz | Compaq Deskpro 386. While that ranks the Inboard 386/PC as the slowest thinker among the three turbos examined here, a software utility provided by Intel lets you

drag things down further, in three discrete steps, to degrade operation back down to the original speed of your PC (allowing you to run games at a playable rate, for example).



Like the PC-Elevator 386, Intel's \$995 Inboard 386/PC has a 16-MHz 80386 processor and IMB of RAM. Because its memory consists of 120-nanosecond chips, two wait states come into play, negating 20 percent of the board's potential throughput compared with a Compaa Deskpro 386

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□ Please rush me the G/Ethernet Performance Comparison Testina Report as well as some more information on the G/Ethernet LAN. ON-BOARD MEMORY The Inboard 386/PC's on-board RAM is logically split with 640K mapped into the DOS addressing range, 256K given over to the extended memory area of the 80386 (intended for use with the disk-caching software), and 128K for copying a portion of the BIOS of its host computer.

The system board memory of the host computer is mapped out of existence and totally inaccessible, Intel believing that you won't ever want to put up with its slow speed again. The Inboard 386/PC is incompatible with host memory expansion boards.

The Inboard 386/PC requires one fulllength, XT-height expansion slot. Intel guarantees compatibility with IBM PC, XT, Compaq Portable, and Tandy 1200 computers that use the 8088 microprocessor and have full-length slots (except for the original IBM and Compaq models). Though they lack Intel's blessing, other 8088-based compatible computers should be just as hospitable to the Inboard 386/PC

Intel claims that, when fully configured with a 2MB daughtercard and 80387 numeric coprocessor, the Inboard 386/PC requires 23 watts. Although it will function on some PCs with 63.5-watt power supplies, depending on what other options may be installed, the manufacturer recommends that such weaker machines be upgraded to at least 100 watts to assure the reliable operation of the board.

As with all replacement-style turbo boards, the Inboard 386/PC connects to its 8088-based host in two ways: through the PC expansion bus itself and through the socket of the old microprocessor as well. Both links are used in the process of moving data around.

Of course, that means you have to resort to taking the extreme step of toying with microprocessors in your PC. Although a scary prospect, Intel makes it easier by giving you a stamped metal tool to aid you in prying out your old 8088, along with a static-free tube in which to store the expatriated chip. Perhaps the most difficult part of the installation process is plugging a short (7-inch) cable into the vacant microprocessor socket and a connector on the In-

board 386/PC itself. While you're inside your PC or XT, you'll also have to remove any memory expansion options you've installed or add enough new RAM chips to bring its total memory to exactly 256K. (The Inboard is incompatible with early model PCs with 64K system board RAM.) You'll also have to reset the motherboard DIP switches to reflect the amount of RAM on the system board.

No software installation is required to put the Inboard into operation. However, you'll have to modify your CONFIG.SYS file to take advantage of the Intel disk

cache. Because, for the most part, the original BIOS of your computer is still used by the Inboard 386/PC, software compatibility is hardly affected by its installation at all. For instance, IBM BASICA continues to be available to you.

As this review is being written, upward software compatibility remains a promise. The Inboard 386/PC will run neither IBM OS/2 nor Windows/386. However, Intel and Microsoft, jointly and separately, are working on new versions of both that will be compatible. Xenix compatibility is also promised.

OUADRAM CORP. Ouad386XT

About 3 years ago Quadram Corp. introduced one of the first replacement-style turbo boards, the Quadsprint, to upgrade plain PCs to the 8086 microprocessor, about a twofold performance improvement. Today, the same installation effort and the Ouad386XT will boost your PC's



A If three 80386-based turbo boards approach but do not pass the processor performance levels of the Compaq Deskpro 386, although Applied Reasoning's PC-Flevator 386 does outper form the Deskoro 386 in the Instruction Mix test Intel's Inboard 386 PC and Quadram's Quad386X7 turn in good results on the video tasts despite the fact that a problem for any turbo board is I/O performance. Because 32-bit data from the turbo board's processor and memory chips is slowed down in the 8-bit bus of the XT, it is very difficult to match the performance of a 386 machine in these categorias

The NOP benchmark test is designed to measure raw clock speed and memory access time while minimizing caching. This levt executes almost nothing but NOP (No n") mechine code instructione in e big 128K loop The 80386 Instruction Mix benchmerk test measures the time it takes to execute a selected senes of processor intensive tasks. The test progrem uses 80386 instruction. instruction set. The 80386 instruction Mix implements e number of 32-bit operations. In the 80386 processor these become single instructione whereas in the 8086 and 80286

The Floating-Point Calculation benchmark test mass. ures processor speed by looping through a senes of float ing-point calculations, including multiplication, division, sponentiation, and logarithmic and to tions. The benchmerk program uses the floating-point library included with Microsoft C Compiler 4.0.

The Conventional Memory benchmark test allocs 256K of conventional memory and treats it as a series of 64-byte records. Then, 16,384 random records are read into and written from this memory. The result shown is the

The DOS Diek Accese benchmark test measures the time if tekes to do a readom sector read using DOS, DOS buffers are set at 3 and the interleave factor is left at the

The BIOS Dick Seek benchmark test measures the time I takes to do e random seek using the diek's ROM BIOS The test result includes minimal softwara overhead and may not parellel the manufacturer's claimed average access time. The test program performs 1,000 seeks. The average result is shown in miliseconds.

erage result is shown in mili

bandwidth of the video adapter by writing directly to the 3 The entire screen is updated using the assembly lar guage REP STOSW instruction with register CX equal to 2000. This is done 1,000 times, and the result shown is the

The Video BIOS Routine with Scrolling benchmark inst measures the speed of the BIOS Teletype routine with The test is performed in video mode 3. The screen is cleared end 240 lines of 60 characters each (in cluding e terminating camage return end line feed) ere written to the display through the BIOS Teletype routine Although the first 24 lines written to the display do not in-

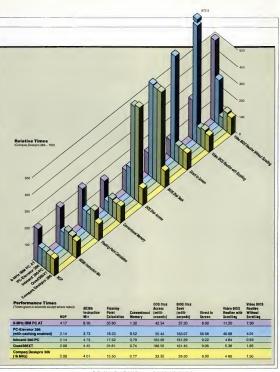
rolling, all the remaining lines scroll the display. The Video BIOS Routine Without Scrolling benchmar test measures the speed of the BIOS listetype routine with out scrolling. The test is performed in video mode 3. The reen is cleared end 24 lines of 60 charactere each (in cluding a terminating carnage return and line feed) are with ten to the display through the BIOS Teletype routine. This is boats.



Personal Computer Enhancement Operation 5200 NE Elam Young Pkwy. Hillsboro, OR 97124 (503) 629-7354 List Price: \$995; 2MB daughtercard with IMB RAM installed, \$645; with 2MB RAM

installed, \$1,145. In Short: A replacement-style 80386-based turbo board that integrates well and delivers

appy video and disk performance



thinking speed more than tenfold.

The pace of those innovations indicates the constant attention Quadram gives to its performance enhancement products, and the Quad386x7 has benefited immensely by that vigilance. Previously rated as a visually flawed and somewhat expensive also-ran in the 386 turb of sweepstakes just months ago, it now bears the lower, competitive price of 5995 and delivers greatly enhanced on-secree performance.

Although equipped with the same microprocessor and the same memory configuration and chips as the Intel Inboard 386/PC, the Quad386XT manages to squeeze out slightly better performance while giving you more coprocessor options and greater expansion potential. Its only fault is in disk speed enhancement.

Both IBM PCS and XTs can be upgraded with the Qualt86XT. However, Quadram requires that the computer host have a power supply rated at 130 waters or greater. Compatibility with clones is defined by its exclusions. Quadram specifically notes that the 8086-based AT&T 6300 and Compaq Deskpros are incompatible. Otherwise, any 8088-based computer is a like-up and the proposed of the p

The central processor of the Quad386XT is the requisite 80386 operating at 16 MHz, with one wait state imposed by the needs of its dynamic RAM chips. A total of 36 of them are soldered to the Quad386XT board, all of the 120nanosecond, 256-kilobit configuration. Headers allow adding a memory-expansion daughtereard with either 2MB or 8MB capacity, so you can stretch the 32-





Quadram's Quad380xT, priced at 8995, is a replacement-style nut-b board like the Intel Inboard 386iPC. When it is installed, data simply circumnavigates the 8088 processor on your XT's motherboard. Tests show it to be a slightly faster performer than Intel's board.

bit RAM of your 80386-enhanced PC system up to a maximum of 9MB.

The functional division of that RAM rates as somewhat unusual. Instead of arbitrarily consigning DOS its 640K maximum, the Quad386XT allocates only as much high-speed 32-bit memory to DOS as you have 8-bit RAM installed in your PC. If your PC merely has its system board full with 256K the Quad386XT does not operate with 64k system board PCSs, gou only get 256K of fast DOS memory with the Quad386XT does.

Quadram does its best to make this seeming flaw into a feature. Because of it, you don't need to reset DIP switches when installing the Quad386XT. Moreover, the remaining 8-bit RAM can be used for other purposes, such as EMS, through the memory-mapping abilities of the 80386. An EMS driver is supplied with the Ouad386XT.

According to Quadram, most people upgrading their PCs to 80386 technology will likely have already installed 640K. Using existing expansion boards also helps you take advantage of the multifeatures of multifunction boards—serial and parallel ports, clocks, and so on—that you might lose when installing a board like the Inboard 386/PC.

The Quad386XT allows for a number of coprocessor options through a vacant socket on the board. Into this socket you can install an 80287 coprocessor on a special daughtercard, directly plug in an 80387, or slide in the much superior Weitek 1167 coprocessor.

SOFTWARE INSTALLATION Installing the software necessary for bringing the QuadSBACY to life is facilitated by an automatic program that makes the needed entiries for two device drivers in your PC's CONFIG.NSY Bit. One device driver activates the virtual 8086 mode of the 80386 which can be defected latter in case of unusual program incompatibilities), and the other substitutes for your PC's video BIOS routiness to good up seven changes so you SUSS6 this is styline vous.

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386-BASED TURBO BOARDS



A Toss-up

Its's a photo finish between Intel's Inboard 386/PC and Quadram's Quad386XT.

Differences in performance and features are slight—particularly considering the level of enhancement they bring to your PC—and the prices are now identical. Although the Quad386XT still has a few rough edges, it also has more memory and performance options than the Insel board. You will be delighted with either one of the they one of the they one of the price.

That's not to slight the PC-Elevator 386. However, this more costby product should win favor in a more specialized market—among those who need the utmost in processing horsepower for running compilers and digit-crunching programs that don't require on-screen speed.

The installation instructions are adequate, but if you follow the hardware installation procedure, you may be in for dissurer. While the instructions indicate that connectors for the 13-inch-long cable between the 8088 socket and the Quad386XT board are keyed to prevent improper insertion, neither cable of the two Quad386XTs were tasted was few Quad386XTs were tasted with the process of th

At present, the Quad380XT is incompatible with Microsoft Wadsows18% and OS2. Drivers necessary to operate such software are expected in lune, according to Quadram. The Quad386XT runs DESQview 2.0 off-the-shelf but will require an asy-ternvaliable driver for PC-MOS386. According to Quadram, compatibility upgrades for Quad386XT ownstrs will be available for a nominal charge.

Winn L. Rosch is a contributing editor of PC Magazine.

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HI-Tasking 40 (64) tasks per PC (AT).

minal and remote access. ONX is both multi-tasking AND multi-user, allowing up to 16 terminals and modems to connect to any computer.

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run your unmodified ONX applications on any mix of machines, either standalone or in a ONX local area network, in real mode on PC's or in protected mode on AT's

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the gate. In fact, ONX is in use at thousands of real-time sites, right now.

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A NEW BEGINNING FOR PC APPLICATIONS

OS/2 is the first operating system for grown-up personal computers. Its introduction means that programmers that programmers will be able to set new standards of excellence with grown-up applications.

he product does not appear to be revolutionary. It comes in a simple box with a binder, just like DOS. The name of the product is printed in large letters colored like neon lights. The description on the box reads:

The IBM Operating System/2 Standard Edition provides significant new memory-management functions, offers enhanced ease of use, and serves as a platform for future application growth. It can support large memory, multiple applications running concurrently, and IBM Personal Computer Disk Operating

System [PC-DOS] applications.

Inside the binder are four diskettes. You put one of them in drive A: of your PC AT (or PC-XT Model 286, or PS/2 Model 50 or above), press Ctrl-Alt-Del, and 10 minutes later OS/2 1.0 is installed on your hard disk, replacing DOS.

With OS/2 1.0 installed, you can con-

tinue to run your existing DOS programs—most of them, anyway—and you can also run new programs designed specially for OS/2. These new OS/2 programs can be multitasked and can take advantage of the full 16MB memory space available to the Intel 80286 microprocessor running in protected mode.

in protected mode.

The product does not appear to be revolutionary, yet OS/2 is potentially the most
important PC software product since the
introduction of the PC itself. OS/2 is a
grown-up operating system for grown-up
personal computers running grown-up apnlications.

From a user's perspective, this will not be immediately apparent. Very simply, OS'2 does not provide any real advantage over DOS for running existing DOS programs. Running DOS programs user of the user, nothing more. In fact, some DOS applications and many DOS device drivers simply

will not run at all under OS/2.

The real story of OS/2 is the story of the future of PC application programs. This story is not easy to tell because these applications-the applications that take full advantage of OS/2-have not yet been written, conceived, or even dreamed about, With the introduction of OS/2, the PC software industry is virtually starting over again with a new operating system standard and new potential levels of excellence.

THE OS/2 DIFFERENCE OS/2 is a single-user multitasking operating system developed by Microsoft and IBM that runs on personal computers based around the Intel 80286 or 80386 microprocessor. OS/2 requires an 80286 or 80386 microprocessor because it uses the protectedmode operation of these chips

Protected mode gives OS/2 applications access to a 16MB address space and allows OS/2 to implement many sophisticated operating system features. These features include multitasking (running multiple programs concurrently), program isolation (if one program crashes, the whole system doesn't crash), virtual memory (using disk space as overflow from available memory), various forms of interprocess communication, and file sharing. On a technical level, OS/2 is more closely akin to operating systems designed for minicomputers and mainframes than it is



Operating System/2 Standard Edition 1.0

- IBM Corp.
- Consult your local authorized IBM dealer. List Price: \$325 (\$200 for licensees of DOS
- Requires: 2MB RAM (1.5MB if DOS mode session is not required); IBM PC AT, PC-XT Model 286, or PS/2 Model 50, 60, or 80; hard disk with SMB available space, one 5%-inch 1.2MB disk drive or one 3%-inch
- L44MB disk drive. In Short: OS/2 is Microsoft's and IBM's successor to DOS for personal computers
- with an 80286 or 80386 microprocessor. It can run new OS/2 programs and most exist-
- ing DOS programs. Not copy protected.

O: What is an operating system? A: An operating system is a program that allows other programs to run. At the vantage of MCA.

EVERYTHING YOU EVER

BUT WERE AFRAID TO ASK

WANTED TO KNOW ABOUT OS/2

- very least, the operating system is responsible for loading programs into memory and managing the file system of the computer. It also provides access to commands like COPY, SAVE, and DIR.
- O: What makes OS/2 so much better than DOS? A: OS/2 provides facilities that will allow software developers to create better programs for the rest of us to use. These new programs can be multitasked (run at
- O: What happened to DOS 5 and ADOS? A: OS/2 is DOS 5 and ADOS.

the same time) under OSP

- O: Can OS/2 also run programs I al-
- ready have? A: Most of them. OS/2 provides a "DOS compatibility mode" for running most existing DOS programs. However, OS/2 provides no advantages over DOS for these programs.
- Q: Do you need a PS/2 to run OS/2? A: No. Although they have similar names and IBM announced the PS/2 series and OS/2 at the same time, they have little to do with each other, OS/2 doesn't run on the PS/2 Models 25 and 30 because they do not have 80286 microprocessors OS2 also runs on the IBM PC AT and the IBM PC-XT Model 286.
- O: Do I need an IBM machine to run OS/22
- A: No. What you do need, however, is an AT compatible-a machine that has an 80286 or 80386 microprocessor Most major manufacturers of AT compatibles will release versions of OS/2 configured for their own machines.

- O: How does OS/2 use the Micro Channel architecture (MCA) of the PS/2? A: OS/2 does not take any special ad-
- Q: Why won't OS/2 run on my PC or PC-XT
- A: OS/2 uses the "protected-mode" operation of the 80286 microprocessor. The PC and PC-XT have an earlier microprocessor known as the 8088.
- Although they have similar names and IBM announced the PS/2 and OS/2 at the same

time, they have little

- to do with each other. O: Can I replace the 8088 in my ma-
- chine with an 80286? A: Not directly. Several manufacturers (such as Microsoft) will be selling 80286 accelerator boards that run under OS/2. You could install this board in your PC or PC-XT.
- O: I have a "no-name" AT clone that runs the IRM version of PC-DOS Can I run IBM's OS/2 on this machine? A: Possibly. If you cannot ask the manufacturer, try asking the retailer who sold it to you.
- O: What's the difference between the IBM version of OS/2 and other manufac-
- turers' versions of OS/2? A: Different versions of OS/2 are available from different manufacturers be-

cause OS2 must be specially configured for a particular manufacturer's hardware. Every hardware manufacturer gets OS2 from Microsoft. The differences in the result versions will be mostly in device drivers that are specific for a particular manufacturer's products and installation procedures. There should be no differences that will affect application programs.

Q: Who wrote OS/2, Microsoft or IBM?

10N1:
A: The official word is that OS2 was developed under the IBM/Microsoft John Development Agreement. Details about the actual division of work are closely guarded. Some important structural elements of OS2—such as dynamic linkings—have their origin in Microsoft with odows. On the other hand, the Program Selector seems to have been influenced by IBM's TopView.

Q: I heard that OS/2 is big and slow. Is this true? A: It's big, but it's not slow. In some

ways it's faster than DOS, in other ways about the same.

Q: I heard that OS/2 is an attempt by IBM to make a proprietary operating system that no one else knows about. Is this true?

A: The technical documentation for OS/2 is more extensive than that for DOS. Adding extensions to OS/2 is easier than adding extensions to DOS.

Q: I currently have DOS 3.x on my hard disk. Do I have to reformat to install OS/2?

A: No.

Q: Can I leave DOS on my hard disk if I install OS/2?

A: No. When you install OS/2 on a hard

disk, it replaces DOS. However, you can continue to boot up DOS from a floppy disk and use the hard disk under DOS.

Q: What's the Presentation Manager? A: The Presentation Manager is part of 05/21.1. It should be available later this year. It's a graphical windowing environment for 05/2 that looks and acts like Microsoft Windows, Version 2.0.

Q: Is the Presentation Manager the OS/2 version of IBM's TopView?

A: Basically, no. But some TopView influences are discernible in the Presentation Manager if you look at it very, very closely and use your imagination.

Q: Does Windows 2.0 run in the DOS compatibility mode?

A: Windows 2.0 does. Windows 1.0 and Windows/386 do not.

Q: Can I use Lotus/Intel/Microsoft expanded memory in DOS compatibility mode?

A: In theory, yes. However, this will require a new version of the expanded memory manager that has been converted to OS/2.

Q: I don't have an AT and have no plans to upgrade my hardware soon, so I'm stuck with using DOS. Have I just been made obsolete?

A: Of course not. As a DOS user you have available a software application base that is larger than that for any other personal computer operating system. There are millions of machines that will not run OS/2. The applications will not disappear until these machines no longer exist.

Q: How long will DOS be around? A: Probably longer than any of us would like to believe.—Charles Petzold to those for personal computers.

Although OS/2 goes far beyond the capabilities of DOS, a few features in OS/2 have been present in some shape or form on PCs and ATs for a couple of years. For this reason, OS/2 at first seems less significant than it really is.

For example, OS/2 is not the first system for the PC to multitask programs. Windowing environments such as Quaterdeck's DESQview, IBM's TopView, and Microsoft Windows have been available since 1985. These systems run on top of DOS and can even multitask some DOS anolications. OS/2 does not. OS/2 does not. OS/2 does not.

OS/2 is not the first system to break the 640K DOS memory barrier. DOS applications designed to use bank-switched memory described by the Lotus/Intel/Microsoft expanded memory specification (LIM EMS) can also use memory beyond 640K.

OS/2 is not the first operating system for the AT that runs in protected mode. Microsoft's Xenix (a UNIX look-alike) for

the PC AT has been running in protected mode for years.

OS/2 is not the first system for the 80286 microprocessor to switch between real mode and protected mode, giving new applications a larger memory space while also running DOS applications. Several "DOS extenders" that work with specific language compilers have done this.

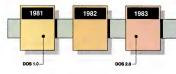
OS/2 is not the first operating system to give applications access to advanced minicomputerlike features. Again, Xenix has plenty of advanced features.

What makes OS/2 unique is that it is the first full-fledged multitasking operating system for the 80286 microprocessor that can switch back and forth between protected mode and real mode to run both new programs designed for the operating system and most existing DOS programs.

This gives current users of DOS a relatively smooth upgrade path to OS2. Os2 protects investments in DOS application programs while allowing these applications to be replaced with OS2 versions as they become available. Installing ISS? does not require reformatting a hard disk that is already configured for DOS. OS2 uses the same file system, so data files created by DOS applications can immediately be used by the OS2 versions of these programs. Most of the familiar DOS com-



The introduction of OSQ2, Version 1.0, is just a data point in the line of PC operating environment in the line of PC operating environment. While OSQ2 opes for beyond the capabilities of DOS, many of its features have been available to PCs and ATs for several years: windowing environments such as Coustredecks DESCHOWN. IRMS TOP IMPROVED AND TO



mands and command syntax are duplicated under OS/2.

OS/2 is also the only operating system to be identified by IBM and Microsoft as the successor to DOS for 80286- and 80386-based machines.

Bearing the imprimaturs of both IBM and Microsoft is very important. Most of the major mainstream software companies (Lotus, Ashton-Tate, and Borland, among others) have already made a commitment to developing OS/2 versions of their products. These upgrades should become available over the next year or so.

The PC industry lives and breathes by standards. An operating system is almost automatically a standard because it serves as a focal point around which any number of applications programmers can design their products. How do standards come about? They emerge from a consensus of important companies. In this respect, even though few OS2 applications are now on the shelves, OS2 is already a standard.

THE FIRST PC STANDARD OS/2 has a big job ahead. The success of the operating system can be measured only by the extent to which it replaces DOS on 80286-and 80386-based machines. DOS has been such a solid standard on PC since IBM's

introduction of the original PC in August 1981 that this at first appears impossible. DOS is currently running on some 12 million machines. The DOS application base

DOS is currently running on some 12 million machines. The DOS application base is measured in tens of thousands of programs.

DOS began life in 1980 at a time when the standard operating system on small computers was CPM. CPM ran on machines built around the Intel 8080, an 8-bit microprocessor with a 64K memory space. The first version of DOS was originally developed at Seattle Computer Products as a CPM clone for Intel's more recent 8086 microprocessor, a 16-bit chip that addressed IMB of memory. Under contract to IBM, Microsoft acquired DOS and adapted it to the then-screet IBM PC.

Although the 8086 microprocessor (and the similar 8088 used in the PC) could not directly run CP/M programs, it was fairly easy to convert a CP/M program to DOS. Many of the early DOS programs (such as WordStar) were simple conversions of CP/M programs.

In the 6½ years since the introduction of DOS, the operating system has gone through two major revisions. DOS 2.0 (March 1983) added hard disk, directory support, and some other features (such as file handles and redirection of standard in-

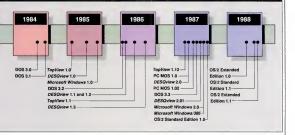
put and output) that were strongly influenced by UNIX. DOS 3.0 (August 1984) and later versions added network support.

Also in August 1984 IBM introduced the PC AT, the first IBM personal computer to use Intel's 80286 microprocessor. This is where the story of OS/2 begins.

THE LEAP TO PROTECTED MODE
The 80286 microprocessor in the PC AT
can run in two distinct modes. These are
run mode (see failly) compatible with the
8088 microprocessor used in the PC and
addressing the same IMB of memory
space) and protected mode, in which the
80286 can address 16MB of memory. As
proviously explained, protected mode also
provides on-chip support of safe and efficient
multitaking, program isolation, and

virtual memory.

The introduction of the PC AT presented a problem. Making the leap to protected
mode was certainly important for the industry that had grown up around the IBM
C—as important as the earlier leap from
CPM to DOS. But DOS supported only
real mode. Speculation about "in protected-mode version of DOS" began soon afeff the introduction of the AT. Over the
years while it was being developed by Miterosoft, this occurating system was known
crossoft, this occurating system was known



as DOS 5, 286DOS, CP/DOS, Advanced DOS, and ADOS.

At one time many people believed that a protected-mode vension fDCS might be able to multitask existing DOS programs in the full 16MB of memory space. But most existing DOS application programs accessed memory and used the hardware of the PC in ways that violated various that the protected mode. Attempting to the protected-mode environment caused cipping speed degradation and did not work at all with some versions of the 80286 chip.

The approach eventually taken in OS2was to support both a protected-mode environment for new programs (called COS2 mode¹) and a real-mode environment for existing DOS programs (called COS2 mode¹) and a real-mode environment for existing DOS programs (called also a problem athough the 80256 can be switched from real mode to protected mode, there is no documented method for switching back to real-mode again. Cetting around this obstacle (essentially by resetting the 80286 chip to power-on conditions) added considerable complexities to

The inability of 80286 protected mode to run existing programs can also be

viewed as a blessing. Freed from the constraints of running existing programs in protected mode, Microsoft was able to revamp many aspects of the operating system without worrying about compatibility

problems. The "protected-mode version of DOS" began seeing the light of day late in 1986. The official name—Operating System2—was disclosed on April 2, 1987, the same day IBM announced is 1972 series. Two months later, Microsoft made available an OS2 Software Development Kit so that software manufacturers could not series to the control of the contr

Computer Dealer's Exposition (Comdex). Although the initial release of OS/2 was originally scheduled for introduction in the first quarter of 1988, IBM moved up the date and began shipment of retail versions of OS/2 1.0 in early December 1987.

NOT ONLY AN IBM PRODUCT OS/2 was developed under the IBM/Microsoft Joint Development Agreement. But Microsoft will license OS/2 for sale by computer manufacturers other than IBM, nuch in the same way DOS is sold today.

Many of these manufacturers (such as Zenith and Compaq) will release their own versions of OS/2 configured for their machines.

The first version of OS/2 to become available is BM's version, officially known as "Operating System/2 Standard Edition 1.0." It is sold in both 54-inch and 34/-inch flooppy disk versions and runs on IBM's Pc AT, Pc-XT Model 286, and PS/2 Models 50, 60, and 80. The versions of OS/2 available from other manufacturers will run on their AT compatibles and support their unique hardware.

OS/2 Standard Edition 1.0 is only the first of several versions of OS/2 to be released over the next year. These other versions are discussed in the sidebar "Enhancing OS/2."

CONTROVERSY AND OPPOSITION Over the past year, OS/2 has become controversial. Many journalists, industry observers, software manufacturers, and users have taken sides for and against the new operating system, holly debating what OS/2 is and what it should have been.

Some people are obviously not happy that OS/2 is only for 80286- and 80386based machines. The introduction of OS/2 divides the installed base of PCs and com-

ENHANCING OS/2

The OS/2 Standard Edition 1.0 is the minimum acceptable operating system for 80286- and 80386-based computers. Additions are planned already.

A lthough the initial release of OS/2—which IBM calls "Operating System/2 Standard Edition 1.0"—is a complete, functional operating system, OS/2 is already scheduled for various enhancements over the next year.

OS/2 1.0 is sometimes called the 'VOS/2 Kemel.' From a programmer's perspective, OS/2 1.0 supports essential operating system functions such as file I/O, memory management, multitastic, interprocess communication, and keyboard and mouse input. From a user's perspective, it has a DOS-like command line that allows the user to run programs and manage files with familiar commands like DIR, COPY, and ERASE.

OS/2 1.0 goes far beyond DOS in the operating system facilities available to application programs, but it is really only the minimum acceptable operating system for 80286- and 80386-based personal computers.

OS/21.1 In October 1988, IBM is scheduled to release OS/2 Standard Edition 1.1. This version of OS/2 includes a graphical windowing environment known as the Presentation Manager. IBM will provide a free upgrade from OS/21.0 to OS/21.1.

OS/2 1.1 is currently being developed under the IBM/Microsoft Joint Develop-

ment Agreement. And OS/2 1.1 will be available for licensing from Microsoft by hardware manufacturers other than IBM, just as OS/2 1.0 is.

The Presentation Manager is an important part of OS/2, and will ultimately define the operating system's look and feel. Both IBM and Microsoft—as well as other software companies—view the Presentation Manager as the primary application environment for OS/2. In fact, some people think of OS/2 1,0

as "OS/2 without the user interface." That may sound a little extreme because OS/21.0 obviously has a user interface in the form of a DOS-like command line. When the Presentation Manager becomes available, the traditional command line interface will still be available, but it will be relegated to secondary importance.

THE PRESENTATION MANAGER graphical The Presentation Manager is a graphical windowing system with a look and feel virtually identical to that of Microsoft Windows. Version 2-0. But whereas Windows is no operating environment that runs on top of DOS and must compensate for many weaknesses of DOS, the Presentation Manager is more closely integrated with the rest of OS2.

Graphical windowing systems were originally developed at the Xerox Palo Alto Research Center (PARC) and have been popularized on small computers by the Apple Macintosh. They offer a friendlier environment for users and are particularly well suited to managing multiple applications.

Every program running under the Presentation Manager occupies a window on the screen. These windows can be individually sized or moved, "maximized" to fill the entire screen or "minimized" to be disblayed as a small icon.

Applications that run under the Presenation Manage will have a consistent user interface. A title bar across the top of the window identifies the application. Below the title bar is a menu with options that can be selected using either the keyboard or a mouse. Options on the menu bar invoke drop-down menus with more options. Some menu items invoke dialog boxes with various fill-in text fields and buttons to specify program commands.

The Presentation Manager includes all of the code necessary to implement this windowing system and user interface. This allows program developers to incorporate the interface in their own applications by calling routines in the Presentation Manager.

Part of the Presentation Manager will be a "session manager" program that will replace the Program Selector in OS/2 1.0 with a heavy-duty file management

pathles almost neatly in half, separating those that can run OS/2 from those that cannot. That's unfortunate, yet the importance of protected mode to the continued growth and progress of the PC industry makes such a split inevitable. (Some manufacturers—such as Microsoft—will be selling 80286-based accelerator boards for PCs and PC-XTS that can run OS/2.)

OS/2 also differentiates itself from DOS in cost and hardware requirements: DOS 3.3 is \$125; OS/2 is \$325. DOS 3.3

requires 128K of memory; OSZ requires 2MB, DOS 3,3 can be run from a floppy disk; OSZ requires a hard disk. It is not clear yet how software manufacturers will price OSZ versions of their applications, but it's certainly possible that OSZ applications will be more expensive. Obviously, this does not sit well with many users. Some people are disappointed that OSZ offers no advantages over DOS for existing DOS applications. Arguing from

ment that the long wait for OS/2 was partially caused by the complexities involved with implementing the "DOS compatibility mode" operation of OS/2.

iny mode operation yet how important the DOS compatibility mode is to the success of OS/2. Certainly it helps in the transition period. Many DOS users can install OS/2 today and gradually replace their DOS programs with OS/2 versions over the next year or so. Anyone who has installed OS/2. system. The session manager essentially replaces the DOS-like command line interface of OS/2 1.0 with a more modern menu-driven interface.

GRAPHICS PROGRAMMING The Presentation Manager also includes a graphics system known as the Graphics Programming Interface (GPI). Applications use GPI to draw within the program's window and use formatted text in various fonts.

OPI is a child with a rich heritage. It combines elements of IBM's mainframe Graphics Data Display Manager (GDDM) and 3270-Graphics Control Program (GCP) and also incorporates some elements of the Graphics Device Interface (GDI) in Microsoft Windows.

GPI is device independent, which means that an application written for the Presentation Manager need not directly access the hardware of a graphics video board or printer. Thus, programs written for GPI will run without change on any graphics hardware that is supported by the Presentation Manager. (This support requires that the hardware manufacturer write a GPI device driver for the graphics hardware.)

IBM'S EXTENDED EDITION The two versions of OS/2 available from manufacturers other than IBM will be called OS/2 1.0 and OS/2 1.1. IBM calls these two versions OS/2 Standard Edition 1.0 and OS/2 Standard Version 1.1.

IBM will also be releasing an OS/2. Extended Edition 1.0 (scheduled for availability in July 1988) and an OS/2. Extended Edition 1.1 (November 1988). Like the Standard Edition 1.1, the Extended Edition 1.1 adds the Presentation Manager to Version 1.0. OS/2 Extended Edition will cost \$725 (or \$645 as an up-grade from the Standard Edition).

The components of GS/2 that make up the Extended Edition are being developed by IBM and not under the IBM/microsoft Joint Development Agreement. What this means is that the Extended Edition will be available only from IBM, for IBM machines, and will not be licensed for sale by other hardware manufacturers.

The Extended Edition adds relational chalabase and connectivity support to the Standard Edition. The database support to the Standard Edition. The database support is based on IBM's mainframer Data Base 2 (DB2) and Structured Query Language (SQL) systems. The connectivity features include network support and communications with IBM minicomputers and mainframers. (Microsoft will make available its own network component available its own network component of OS/2 for licensing by other hardware manufactures.)

IBM's original announcement of the

Extended Edition caused some fears in the industry that IBM was headed toward a proprietary operating system for the PC. The Extended Edition, however, will be of little use on PCs except in environments that make extensive use of

IBM mainframes and minicomputers. Historically, IBM has suffered from a lack of consistency and connectivity among its various systems. The company intends to correct this weakness through its ambitious Systems Application Architecture (SAA) scheme. Both the OS/2 Presentation Manager and the OS/2 Extended Edition are part of SAA. The Extended Edition brings to PCs some of the advanced database facilities that are now available on IBM mainframes. Under Systems Application Architecture (SAA), the Presentation Manager will supply the standard user interface on IBM minicomputers and mainframes.

Whether the Systems Application Architecture plan will actually be realized is not obvious at this point in time (after al). IBM is not known for its consistency of vision), but it certainly does imply an attuacive future. If the Presentation Manager is implemented on other IBM systems, then applications written for the Presentation Manager on the AT can later be recompiled and run on IBM minicomputers and mainframes.

—Chartes PetVo.

DOS program will wish that the DOS compatibility mode were a bit more compatible with DOS than it is.

Some people expected OS/2 to be a multiuser operating system. Multitasking operating systems running on mainframes and minicomputers have usually supported multiple users through terminal so connected to the one computer. But OS/2 reflects a far different environment that is closer to the spirit of the personal computer. OS/2 is for single-user machines that can be used by themselves or connected in a network. The emphasis in OS/2 is on running multiple programs in a way that is advantageous for one user. In those environments that require a multiuser operating system, several variants of UNIX (such as Microsoft's Xenix) are available and are obviously preferable to OS/2 for this purpose.

THE 80386 QUESTION Probably the most valid criticism of OS/2 is that Microsoft and IBM should not have wasted their time designing OS/2 for the 80286 microprocessor but should have aimed their sights toward the real future—the 80386.

The 80286 is certainly not a perfect chip; it is flawed in several ways. The 80286 does not have the direct capability of switching from protected mode back to real mode. The 80386 does. The 80286 cannot run most existing 8086 programs in real mode. The 80386 has a "virtual-86" mode that can mimic multiple 8086 environments.



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OS/2: A NEW BEGINNING

Although protected mode expands the addressable memory in the 80286 from IMB to 16MB, the 80286 is still stuck with a segmented architecture based around 64K segments. The 80386 in-creases the segment size and addressable memory to 4 gigabytes (4 billion bytes). The 80286 internally uses 16-bit registers. The 80286 is clearly vesterably see 16-bit clearly vesterab

The 80386 can easily emulate the 80286, so OS/2 can run on 80386-based machines (such as Compaq's Deskpro 386 and IBM's Model 80). But OS/2 has no direct support of the 80386 except to switch more easily from protected mode to real mode.

In a perfect world, CS/2 would have been released before the 80386 namies became available. Ironically, the delays the problems with implementing the DCs compatibility mode. Under the 80386, DOS compatibility is considerably simpler. In fact, Microsoft Windows 256—released before US/2—uses the 80386's virtual-86 mode to multibask existing authority of the 100 per 100 per

The advantage of designing OS/2 for the 80286 is based more on numbers than on chip capability: of the 12 million or so PCs currently installed, about half have 80286 or 80386 microprocessors and can potentially run OS/2. Less than 5 percent of the installed base of PCs and compatibles have an 80386.

But the 80386 is the microprocessor of choice now. As the 80386 machines assume a larger share of the market, we will surely clamor for an 80386 version of OS-2. This is in the works, but nobody knows much about it. Microsoft has stated that it will not be called OS-2, ONy guess that it will be called OS-2, ONy guess a O. Microsoft has also stated that a software of the other of OS-2 will be available next year. That would indicate or teless date in 1990.

UNRESOLVED PROBLEMS OS/2 does not solve all the problems with DOS. The most serious is the inadequacy of the DOS file system, including the 32MB limit on hard disks.

One method around this hard disk limit is currently being used by Compaq in MS-DOS 3.31. This allows the use of hard disks with up to 512MB. Compaq's version of OS2 will also support this scheme. But the 32MB limit is only one of several problems with the DOS file system. What's really needed is an overhaul. We need filenames longer than eight characters with a three-character extension, more file integrities and remetition actions of the second of the control of the second of the control of the second of the control of the second of the seco

eral problems with the DOS file system. What's really needed is an overhaul. We need filenames longer than eight characters with a three-character extension, more file integrity and protection against file corruption, additional file attributes for security and sharing purposes and to identify the property of the control of the protect the file system against sectors that go bad.

Along with the 80386 version of OSt₂, this overhaul is high on the list of necessary enhancements to the operating system. Microsoft has talked about a systemm is calls the "replaceable file system" in which OSt₂ would recognize various types of file systems, perhaps even those associated with other operating systems. This would be a welcome addition to OSt₂.

THE DIFFICULT TRANSITION Progress is the accumulation of lots of little steps and a few very big steps. The little steps are often pleasant changes, easy to adapt to and assimilate into our lives. The big steps are difficult, confusing, and sometimes painful. OS/2 is one of the big

steps.

For the individual user, replacing DOS with OS/2 on a hard disk is relatively easy. For the PC industry, the transition from DOS to OS/2 is a major undertaking. It involves millions of existing machines and tens of thousands of application programs written for DOS.

Yet this is a very important transition for the industry. It indicates a recognition that the PC is no longer a toy but has evolved over the years into a serious tool for serious work. DOS is now hindering rather than helping future evolution.

Microsoft expects OS/2 to establish the foundations of PC operating systems for the next decade. That prediction is not at all difficult to believe. OS/2 has been constructed to be easily expanded and enhanced. The introduction of OS/2 1.0 marks the start of an existing time for the PC and PC applications. The "OS/2 decade" has begun.

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WHAT OS/2 WILL MEAN TO USERS

rom a user's perspective, OS/2 L/0 fles does not seen command nei interface as DOS and recognizes most of the same commands. Although OS/2 includes a meau-driven Program Selection OS/2 includes a meau-driven Program Selection of the same commands. Although OS/2 includes a meau-driven Program Selection of the same common in "DOS although programs and does not replace the OS/2 command line."

The best thing you can say about the user interface of OS/2 1.0 is that it's only temporary. In October of this year, OS/2 1.1 (which includes the OS/2 Presentation Manager) is expected. At that time the command line interface will begin to fade away, replaced by a more attractive graph-

I? And what ics interface.

If you expect WHEN TO UPGRADE Everybody cur-

rently using DOS on an 80286- or 80386based machine will eventually consider upgrading to OS/2. But there's no rush. DOS and DOS applications will be around

for a long time. It will be years before a comparable application base exists for OS/2.

OSZ can run most existing DOS applications but does not offer any advantages over DOS for running them. If you expect OSZ to do some magic with existing DOS programs, you'll be very disappointed. In fact, the DOS compatibility mode of OSZ is not quite as compatible as you might hope. This problem is discussed in more detail in the sidebur "How Compatible Is

DOS Compatibility Mode?"

The conventional wisdom states that upgrading to OS/2 makes no sense until OS/2 applications are available. On the other hand, OS/2 starts becoming useful when you have just one OS/2 application. You can run that application at the same time as a DOS program and easily switch between the two screens (as I describe below).

OS/2 versions of many popular DOS

you upgrade? What hardware will you need? And what can you expect to find when you do?

When should

HOW COMPATIBLE IS DOS COMPATIBILITY MODE?

As in life, so it is with operating systems: transitions are awkward. The next few years will be a transition from DOS to its successor, OS/2. During this time more and more people will install OS/2 on their systems. The early OS/2 users will also experience a transition as they gradually replace their DOS applications with OS/2 versions.

This transition from DOS to OS/2 is allowed by OS/2's DOS compatibility mode (or DOS mode). DOS mode lets OS/2 run most existing DOS programs.

OS 2 run most existing DAS programs.

That DOS compatibility mode exists at all is nearly a miracle. Switching back and forth from protected mode to real mode is not even supported by the 80286 microprocessor. Implementing DOS compatibility mode was one of the most offfeult parts of OS/2 development, and it contributed to the long delays in the operating system's release.

erating system's release.

DOS compatibility mode is ostensibly compatible with DOS 3.3 with the SHARE program loaded. (SHARE is normally used in a networking environment to protect files in use by one program from being deleted or changed by another.)

If you use only fairly normal DOS application programs (such as spreadsheets, database managers, and word processors), you are not connected to a network, and you do not have any nonlably hardware on your machine (with the possible exception of a mosse), you will be in good shape. Even many traditionally troublesome programs (SideKirk, for example) nat fine. The only noticeable example is the programs (SideKirk) completed to the control of the completed of the control of the less memory available to your appliestions than under DOS alone.

But DOS compatibility mode is not a perfect imitation of DOS. Here are the problem areas.

HARDWARE INCOMPATIBILITIES A PC contains several ROM BIOS chips, some on the system board, one on the hard disk controller, and one on an EGA

or VGA video board. Under DOS, the BIOSs serve to hide the workings of the hardware from the operating system. DOS calls routines in the BIOSs and they access the hardware.

Because routines in a BIOS cannot be tun in protected mode, OS/2 cannot use the BIOS except in DOS compatibility mode. OS/2 must contain its own device drivers that essentially duplicate the BIOS lovie.

This could create incompatibility problems with some hard disk controllers. If you've replaced the hard disk in your IBM PC AT but have connected it to the IBM hard disk controller board, that's not a problem. But if you've replaced the hard disk controller or the ROM BIOS chip in the countroller, it's likely that GS/2 will not be able to use the hard disk.

Similarly, some VGA boards for the AT are compatible with the IBM VGA on a BIOS level only; they are not hardware compatible. OS/2 cannot properly use these VGA boards.

In these cases, the manufacturer of the mard disk controller or VGA board must supply you with device drivers that can allow you to use the hardware with OS/2. Some external mass storage devices require their own device drivers to be specified in DeV ICE statements in the CON-CONFIG. SYE has applies to OS/2 mode and DOS compatibility mode; device drivers must run in both protected mode and real mode. Existing device drivers for DOS do not.

Hence if you have an external device (such as an optical disk drive or tape backup unit) that requires a device driver to be listed in the CONFIG.SYS file, you cannot use that device at all under OS/2 until you replace the device driver with an OS/2-version. You'll have to boot up DOS to use the device.

Some DOS software (such as networking programs) create one or more additional disk drives for use under

DOS. This software cannot run properly under OS/2.

80386 PROTECTED MODE OS/2 runs on machines based on the 80386, but it does not take advantage of the 80386 except to provide an easier and faster method to switch from protected mode to real mode.

Any software that takes advantage of the 32-bit registers in the 80386 should not be used under OS/2. OS/2 cannot properly save the upper halves of these registers during task switches.

Programs that run under DOS compatibility mode cannot switch into protected mode. Some recent programs (such as Microsoft Windows/386) use the "virtual-86" mode of the 80386 microprocessor to multitask existing DOS programs. These programs (or programs for the 80286 microprocessor that switch into protected mode to use extended memory) cannot be run under OS/2.

UNDOCUMENTED FUNCTION
CALLS Some programs that will not
run in DOS compatibility mode rely on
undocumented DOS function calls, particularly those that gain access to specific
data areas within DOS.

Microsoft has been telling programmers for years that the use of undocumented DOS function calls would threaten their programs with incompatibilities in future operating systems. Yet the use of undocumented function calls is so pervasive that removing them from OS2's DOS compatibility mode would have been disastrous for many programs.

For example, the undocumented interrupt 21h function call 32h (which returns a pointer to a block of data in DOS that describes the layout of a disk) is supported. Yet function call 52h (which is used for obtaining that same information or all disks on the system) is not supported. Under DOS, the information returned in function call 32h included an address of the device driver, a program could use this to call the device driver directly. Under DOS compatibility mode, the device driver address is not valid.

The infamous "in-DOS flag" and the "DOS scheduler" interrupt are both supported under DOS compatibility mode. These are used by SideKick and many other RAM-resident programs.

TIME-CRITICAL APPLICATIONS Some programs that run under DOS cannot be interrupted. When a DOS program is running under DOS compatibility mode, you can cause the program to be suspended by switching to an OS/2 mode session. Even if you don't explicitly make this switch, OS/2 must allow OS/2 applications to continue to run.

rapple and software. See the other. This problem mostly affects comminications software. Such applications of the serial of the

These programs should be run in DOS compatibility mode only when no OS/2 programs are running—or if the OS/2 programs are doing nothing except waiting for keyboard input.

THE SERIAL PORT DOS programs that use the serial port are trouble-some in other ways. When an DS/2 program serial ports are trained to the control of the co

The solution involves several commands. First, if you have a printer connected to a serial port, you probably have been using the MODE command to redirect parallel printer output to the serial port. You no longer use MODE: instead.

in the parameters, you now specify redirection to SPOOL (the OS/2 print spooler). This allows the printer output from several programs to be stored in a queue. If you want to use the serial port in

OS2 mode (as is definitely the case if you use SPOOL to print to the serial port), you must specify in the CON-FIG.SYS that the communications drivers are to be installed. These drivers are COMOL-SYS (for the AT) and COMOL-SYS (for the PS2 machines Appropriate statements to install these drivers are inserted into your CON-FIG.SYS file during installations.

When one of the COMOx.SYS drivers is loaded, the serial ports are not available in DOS mode. Technically, OS/2 puts zeroes in the addresses beginning at 40:0 in the BIOS data area. This makes it appear to DOS programs as if

the serial hardware does not exist.

To use the serial ports in DOS mode (probably for your DOS communications program), you first turn one of the ports on in DOS mode:

SETCOM40 COM1=ON

When you're done, you turn it off: SETCOM40 COM1=OFF

This also prevents an OS/2 program from attempting to use the same port.

NONREADABLE ECA REGISTERS Some DOS programs—particularly those that do graphics—directly acress the registers on the EGA board. Most of these registers are write-only. This means that OS/2 cannot completely determine the state of the registers if you switch away from DOS mode while such a program is running. And when you switch back to DOS mode, the state of the EGA cannot be restored.

IBM's OS/2 manual has a simple recommendation for using such DOS programs: "If this [problem] occurs, do not switch from DOS mode until you have completed your task."

The VGA adapter in the PS/2 models doesn't have this problem. All registers are readable, and OS/2 can correctly restore the video state.—Charles Petzold programs will become available over the next year or so. Software developers have had copies of OS/2 since June 1987, and some early OS/2 programs were demonstrated at the November 1987 Computer Dealers 'Exposition (Comdex).

OEM VERSIONS The IBM version of OS/21.0 runs on the IBM PC AT, the PC-XT Model 286, and the PS/2 Models 50, 60, and 80.

Mary users of AT compatibles available from manufacturers other than IBM to manufacturers other than IBM DOS (other called PC-DOS) on their machines. This is possible because DOS cots at our file of the DOS of the called to the full control of the DOS collection of a markine to use the disk drivers, video disply, keyboard, and other peripherals. Instead, DOS calls various routines in the compater's ROM BIOS. The ROM BIOS can hide variations in hardware design from the operating system.

Under OS2, this is not the case. The ROM BIOS routines run only in real mode. OS2 must be able to use the disk drive and other peripherals while running in protected mode. For this reason, OS2 duplicates all the ROM BIOS logic indevice drivers included with the openingsystem. This has a serious implication: a non-IBM machine that currently runs the IBM version of DOS will not necessarily be able to run the IBM version of OS2.

On the other hand, most applications that run under OS² will have far fewer compatibility problems with not-quite-compatible hardware. Applications that were forced to access computer hardware directly under DOS can use normal OS/2 function calls under OS/2.

OS2 will be marketed by Microsoft in much the same way DOS is. Microsoft will license OS/2 to hardware manufacturers that wish to configure it for their own machines. This is called an "OEM (original equipment manufacturer) adaptation." The hardware manufacturers can then self these versions of OS/2 to users of their ni chines.

Many of the larger manufacture AT compatibles (such as Compaq an nith) will adapt OS/2 for their m just as they adapted DOS in the pa smaller manufacturers may als their own OS/2 adaptations or a

		05/2 Support		
WORD PROCESSING		Supports Version 1.8	Plans to support Version 1.0	Plans to support Presentation Manager
Display Write	IBM	0	● (DisplayWrite Twin)	Won't disclose plans
Microsoft Word	Microsoft Corp.	0	Won'i disclose plans	Won't disclose plans
MultiMate	Ashton-Tate	0	(date uncertain)	(date uncertain)
WordPerfect	WordPerfect Corp.	0	(date uncertain)	Won't disclose plans
WordSter	MicroPro International Corp.	0	(date uncertain)	(date uncertain)
WordSter 2000	MicroPro International Corp.	0	(date uncertain)	(date uncertain)
Xy Write	XyQuest	0	0	•
SPREADSHEETS	.,,			
Microsoft Excel	Microsoft Corp.	0	0	● (3d quarter 1968)
Lucid 3D	Personel Computer Support Group	•	• (evalleble now)	0
Lotue 1-2-3	Lotus Development Corp.	0	● (Release 3, 2d quarter 1988)	Won't disclose plans
Quettro	Borland International	0	(dete uncertain)	 (date uncertain)
SuperCelc4	Computer Associates International	0	0	 (date uncertain)
DATABASES				
BASE	Ashton-Tate	0	● (date uncertain)	(date uncertain)
PFS:Protessional File	Softwere Publishing Corp.	0	Won't disclose plans	Won't disclose plans
DAA	Symantec	0	Won't disclose plans	 (date uncertain)
R:base	Microrim	0	(1st querter 1988)	(date uncertain)
Reflex: The Analyst	Borland International	0	0	0
GRAPHICS				
Chart-Mester series	Ashton-Tate	0	0	 (date uncertain)
Freelence Plue	Lotue Development Corp.	0	(date uncertain)	Won't disclose plans
Herverd Graphics	Software Publishing Corp.	0	(dete uncertain)	(dete uncertain)
COMMUNICATIONS				
Crosstelk XVI	Microstuf	0	 (dete uncertain) 	(dete uncertain)
Smertcom	Heyes Microcomputer Products	0	Won't disclose plans	Won't disclose plens
DESKTOPPUBLISHING				
PagoMeker	Aldue Corp.	0	(date uncertain)	(date uncertain)
fenture Publisher	Xerox Corp.	0	Won't disclose plans	Won't disclose plans
*D	Autoriesk	0	● (1988)	(date uncertain)
-			3 (1000)	- John Scholary
Aid	Computer Associates Internetional	•	● (1st quarter 1988)	(date uncertain)
8	Ansa Softwere	0	● (1st quarter 1988)	Won't disclose plans
- 18 -	wil	•	(available now)	(date uncertain)
State of the state	< Softwere	•	● (1st quarter 1988)	0
St. Seither	Associates	● (Expert/2)	0	(date uncertain)

Environmental Su	pport			
Supports DOS 3.0 or later	Supports Windows 1	Supports Windows 2	Supports UNIX version	Supports Moc version
(Draptey Write IV, Versions 3.2 and 3.3)	0	0	0	0
•	0	0	•	•
•	0	0	ō	ō
•	•	•	Available 1st quarter 1988	Available 1st quarter 1988
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•	D.	10	0	Available 4th quarter 1988
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•	0	0	0	0
•	Not tested	Not tested	0	Available 4th quarter 1988
•	•	•	0	0
•	0	0	0	0
•	0	0	0	•
•	• (Version 1.0 or later)	• (Version 3.0 or later)	0	• (Version 20a)
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•	0	0	•	0
•	0	0	0	0
•	0	Available 2d quarter 1988	•	0
•	•	•	0	0
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THE LOOK OF OS/2 1.0

OS/2 1.0 often looks and acts like DOS. Though it includes a menu-driven Program Selector, OS/2 has the same command line interface as DOS and recognizes most of the same commands. The best thing about OS/2 1.0's interface is it's temporary.





Screen 2: The menu in the Program Selector includes options to add. change, or delete an entry in the Start a Program list.



Screen 3: Adding a program to the list requires entering a descriptive name, the file path and name, and optional parameters.



Screen 4: All error messages from OS/2 commands are numbered. Help provides more information and possible remedies.



Screen 5: The "Abort, Resry, Ignore" message in DOS is replaced by a pop-up screen in OS/2.

fications in their hardware to accommodate the IBM version of OS/2.

In the long term, OS/2 is likely to have two contradictory effects on the hardware manufacturers:

■ Smaller companies manufacturing AT compatibles may not want to bother adapting OS/2 to their hardware. It may be easier for them to change the design of their machines to imitate the IBM PC AT more closely. This will create a class of "ultra-clone" machines that can run the IBM version of OS/2.

■ More-adventurous hardware manufacturers are no longer bound by the IBM hardware standard. If they can adapt OS/2 to run on their machines, variations in the hardware design will not cause compatibiity problems with OS/2 applications. This has the potential of allowing manufacturers to break free of the IBM reflection and use of the rest of the office of the IBM reflection and creativity in designing their own hardware their own hardware.

Most existing 80286 and 80386 accelerator boards for the PC and XT will not run OS/2, which requires some special

■ Most existing 80286 and 80386 accelerator boards for the PC and XT will not run OS/2, which requires special hardware not on these boards.

hardware not present on these boards (such as the AT's CMOS clock). Some manufacturers, however, are designing 80286 and 80386 accelerator boards specifically for running OS/2.

OS/2 thARDWARE REQUIREMENTS OS/2 is big. The IBM version comes on four high-density floppy disks: 1.2MB 5¼-inch disks for the PC AT or the XT Model 286, or 1.44MB 3½-inch disks for the PS/2 Models 50, 60, and 80.

To install OS/2 on your hard disk.

you'll need at least 5MB of available disk space. When installed, OS/2 uses about 3MB of disk space, and another 512K of

space is allocated for swapping purposes.
OS/2 1.0 also requires 2MB of memo-

ry, or about 1.5MB of "extended memory" beyond the 640K of "conventional memory" that is normally used by DOS. Memory boards available for the AT usually provide extended memory, either

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■ OS/2: USER'S PERSPECTIVE

alone or combined with memory conforming to the Lotus/Intel/Microsoft Expanded Memory Specification (LIM EMS). Often these memory boards can also "backfill" to increase the amount of conventional memory to 640K. (For more details, see "Taking Your AT's Memory to the Maximum," PC Magazine, August 1987.)

If you are interested only in having enough memory to run OS/2 and do not need to use EMS for DOS applications, it's best to buy an AT memory board that does not support EMS. EMS support takes up space on the board that could otherwise be used for more memory chips. If your AT currently has a memory board that is used entirely for EMS, you may have to change some DIP switches on the board to allocate some of that expanded memory as extended memory.

If you have an IBM PC AT with 512K of memory on the system board, you will need a memory board with at least 2MB. The first 128K of memory is used for increasing the DOS memory size to 640K. and 1.5MB is allocated as extended mem-

Installation of OS/2.

does not require reformatting your hard disk. If DOS is already

installed, OS/2 replaces the two hidden DOS files.

ory. (Extended memory is generally available only in 512K chunks.) If you have a PC AT with 256K on the system board, again you will need a 2MB extended memory board-384K for increasing the DOS size to 640K plus 1.5MB of extended memory.

An IBM PC-XT Model 286 has 640K on the system board; you'll need an extended memory board with at least 1.5MB of memory. If you have a PS/2 Model 50. 60, or 80, you probably have IMB on the system board-640K for DOS and 384K extended; you can get by with a IMB extended memory board. Some PS/2 Model 80s have 2MB of memory on the system board; these machines will run OS/2 1.0 without any additional memory.

If you do not wish to run DOS applications under OS/2 (which is unlikely at this time), you can decrease the memory requirement by 512K.

It's best to plan ahead. The Presentation Manager component (available in OS/2 1.1) will require more memory, so a board that can use a piggyback to increase the memory capacity is a good bet now.

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OS/2 1.0 supports a mouse. The IBM version of OS/2 includes device drivers for the IBM, Microsoft, Mouse Systems, and Visi-On mice. A mouse will become increasingly useful when the Presentation Manager becomes available. The Presentation Manager will also require a graphics display.

INSTALIATION Installation of OS/2.2 does not require reformatting your hard disk. If DOS is already installed on the hard disk, OS2 replaces the two hidden DOS files (IBMBIO.COM and IBMDOS. COM) with the OS2 versions. The IBM manual recommends that you make a boosheDOS diskettle before you begin installing OS/2, in case you later need to boot up DOS.

Normally it is not possible to install OS22 and DOS in separate bootable partitions of a hard disk. In terms of partition information, there is no difference between an OS22 partition and a DOS partition DOS to make box calber DOS or Commission of the DOS or disk and use a flooppy disk to boot DOS, you can keep OS22 programs and DOS programs on the hard disk. For example, the DOS external commands can be in a subdirectory called 'DOS while the OS2.

The initial installation of OS2 takes about 10 minutes. You put the disk marked "Installation Diskette" in drive A: press Cut-Atl-Del, and follow the instructions. Although the installation is fairly simple, it is not as fast as it could be. Some dead time at the beginning of the installation does nothing to counter the incorrect but wide-spread impression that OS2? is slow.

The installation of OS/2 copies about 30 files to the hard disk, including 60 files in the root directory. (By contrast, DOS 3.3 contains 52 files, only a few of which need be in the root directory.) The additional files in OS/2 encompass device drivers, dynamic link libraries, and files that support the OS/2 Program Selector, an "Introduction to OS/2" program, and an application installation aid.

The PC Lab Notes column in this issue discusses these files and describes a way you can reorganize the OS/2 directory structure if you feel comfortable doing so.

MULTITASKING OS/2 is a multitasking operating system, which means that it can run multiple programs concurrently. Most users will take advantage of its multitasking abilities through "context switching." OS/2 allows you to switch among different OS/2 programs quickly without exiting one program and starting up the next. You do this by switching among multiple "sessions." (Microsoft earlier used the term screen group to describe these.) In the normal case, each session can run one OS/2 program that uses the full screen. You can have up to 12 sessions active at any time, each of them running a different program or perhaps multiple

At any time, only one session is the current session (sometimes called the foreground session). Programs in background sessions continue to run. A word processing program in a background session can do a spelling check, a spreadsheet program can run a long macro, and a communications eroream can download a file while

copies of the same program. You can

switch among sessions using the Alt-Esc

key combination.

 OS/2's multitasking abilities allow you to switch among different OS/2 programs quickly without exiting one and starting up the next.

you're doing something else in the foreground session.

All sessions share the same file system, so you can save a file from one program and read it into another program. For example, you can save a portion of a spreadsheet in an ASCII format and then read it into a word processor without exiting the spreadsheet and starting up the word processor.

OS/2 implements a network-type filesharing system to protect files in use by a program from being changed or deleted.

Each program has its own current disk drive and directory, so you can change the directory in one program without affecting other programs. Protected mode allows OS2 to isolate programs and prevent them from interfering with each other. In most cases, if noe OS2 program happens to crash, it will not affect the operating system or other programs.

DOS COMPATBILITY MODE. In addition to the 12 sessions available for running OS2 programs, OS2 provides one session for running most existing DOS programs. This is called the DOS compatibility mode session or, more simply, DOS mode. The 12 sessions for running OS2 programs are called OS2 mode sessions.

In one sense, the DOS mode session does not seem very different from the OS/2 mode sessions. You can switch to the DOS mode session the same way you switch among the OS/2 mode sessions, using the Alt-Esc key combination.

But there are some significant differences. The DOS mode session runs in real mode, and the programs cannot take advantage of memory outside normal DOS memory. Although programs in the OSZ mode sessions continue to run when the sessions are in the background, the DOS mode session runs only when it is in the foreground. When you switch to an OSZ mode session, any program running in the DOS mode session is suspended.

Most of the OS/2 external commands such as CHKDSK invoke "dual-mode" programs. The same program runs under CoS/2 mode and DOS mode. Dual-mode programs use a facility of OS/2 called the Family Application Program Interface, or FAPI (rhymes with happy). Aside from dual-mode programs, CS/2 programs cannot be run in DOS mode and DOS programs cannot be run in OS/2 mode and DOS programs cannot be run in OS/2 mode.

As you begin to replace your DOS programs with OS/2 versions you may find you don't need a full 640K for DOS mode. In that case you can reduce the space allocated for DOS mode by changing the line in the CONFIG.SYS file reading

RMSIZE = 640

RMSTZE = 256



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your computers from power problems.

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A few years from now, when all your DOS programs have been retired to the supply closet, you may want to get rid of the DOS mode session entirely. In that case, you change the line in the CON-FIG.SYS file reading

PROTECTMODEONLY = NO

to

PROTECTMODEONLY = YES

THE PROGRAM SELECTOR If an OS/2 batch file named STARTUP-CMD is present in the root directory, OS/2 starts up an OS/2 mode session when the system is booted. Otherwise, booting up OS/2 leaves you in the OS/2 Program Selector (Screen 1). You can also get access to the Program Selector screen at any time by

pressing the Ctrl-Esc combination.

The right panel of the Program Selector is labeled "Switch to a Running Program." This lists all the OS/2 sessions currently running. The DOS mode session is listed here as "DOS Command Prompt." You can switch to a particular session by moving the cursor bar to the name of the program and pressing Enter or by clicking the program name with the moust.

The left panel of the Program Selector is labeled "Start a Program." After installation, this panel lists two programs—the "Introducing OS/2" program, which is included with IBM's version of OS/2, and the "OS/2 Command Prompt." You can start these sessions from the Program Selector using either the keyboard or the

You can add, delete, or change programs listed in this panel from the menu at the top of screen (Screen 2). If you select "Add a Program Title," you fill in a descriptive name for the program, its path and filename, and parameters (Screen 3). Context-sensitive help information is available at any time by pressing the F1

key (Screen 4).

The programs added to the Start a Program panel must be OS/2 programs. If you have several OS/2 applications installed on your hard disk and add them to the Program Selector, it might look something like the screen shown in Screen 5.

THE OS/2 COMMAND LINE When you select the OS/2 Command Prompt op-tion from the Start a Program panel, OS/2 loads a new copy of CMD.EXE (the OS/2 command processor, similar to COM-MAND.COM under DOS), which executes an OS/2 batch file called OS2IN.TT.CMD (similar to AUTOEXEC.BAT under DOS).

The command line interface of CMD.EXE is very similar to that of DOS.

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Microsoft and MS are registered trademarks and MACH 20 and InPort are trademarks of Microsoft *MACH 20 Memory Plus, Disk Plus and Microsoft Mouse are optional. It recognizes most of the familiar DOS internal and external commands and includes a few new ones. If you know DOS, you know how to use most of OS/2.

Perhaps the most interesting new OS/2 command is DETACH. DETACH is an option which allows you to run a program in the background if it does not write to the display or require keyboard input. For example, if you execute

DETACH CHKDSK >MYFILE

the OS/2 command line prompt returns after the program is loaded into memory, and you can continue with other work. When the CHKDSK command is finished, you can look at the output using

TYPE MYFILE

OS/2 also includes a print spooler program called SPOOL. SPOOL intercepts all printer output from OS/2 mode sessions or the DOS mode session, stores it in files,

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performance enhancement system.*

 OS/2's printer spooler program is one of the few OS/2 enhancements that also affect DOS mode.

and sends it to the printer while other programs are running. Printer output from different programs is kept separate. SPOOL is one of the few OS'2 enhancements that also affect DOS mode. Although SPOOL is helpful, it is not very sophisticated. You cannot reorder the priority of print jobs or cancel them.

Some commands have been enhanced. The DIR, ERASE, MKDIR, RMDIR, TYPE, and VOL commands accept multi-

ple arguments. OS/2 also includes enhancements to batch file processing (but not nearly as extensive as some people will want). For example, the STARTLOCAL and ENDLOCAL commands can save and later restore the current drive and directory in effect when the batch file was started.

A few DOS programs have not been converted to SS2. The OS2 versions run only in DOS compatibility mode. These include EDLIN, BASIC, and BASICA. OS2 does not include DEBUG or EXEZBIN, but it does include a new LINK that supports the new. EXE file format used in OS/2.

Each error message displayed by OS/2 internal or external commands is a full sentence preceded by an error number. You can type

HELP number

to obtain more information about the error, with possible remedies.



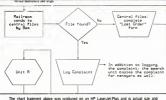
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■ USER'S PERSPECTIVE

The familiar "Abort, Retry, Ignore" critical error message has been replaced with a pop-up screen. Under DOS, critical error messages are sometimes displayed over application output, or they may not be visible at all

Many of the OS/2 external command

 The DOS-like externals of OS/2 are deceptive: the goodies are hidden away inside, waiting to be used by application programs.

files are much larger than the DOS versions. There are several reasons for this. First, most of them have been rewritten in a high-level language (C); the DOS versions were written in assembly language. Second, most of the external commands can be run in both OS/2 mode and DOS mode. This often adds considerable overhead to the program. Other overhead results from the operating system's support of the double-byte character sets used in Japan and other Far Eastern countries. OS/2 programs are written this way to facilitate translating the operating system to those foreign markets. Although most message text is kept outside the programs themselves (again to facilitate translation to foreign markets), the programs must contain some overhead for retrieving the messages.

TOO COMPATIBLE? OS/2 1.0 is at first rather disturbing because it seems too much like DOS. One wonders why OS/2 costs \$200 more. But the DOS-like externals are deceptive. For this first installment of OS/2, all the goodies are hidden away on the inside, waiting to be used by application programs.

The real look of OS/2-the Presentation Manager component of OS/2 1.1-is still a few months away.

Charles Petzold is a contributing editor of PC Magazine.



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PRODUCTIVITY

■ PC LAB NOTES: OS/2 INSTALLATION ■ CHARLES PETZOLD

CLEANING UP AFTER IBM, PART 1

Installing OS/2 puts more than 130 files on your hard disk, 60 of them in the root. Here's how to separate the wheat from the chaff and put everything in its proper place.

ven though DOS has grown with each successive version, when you If first get OS/2 you're likely to be in for a shock PC-DOS 3.3 comes on two regular diskettes and has 52 unique files. IBM's version of OS/2 1.0 comes on four high-density diskettes that contain a total of 134 files. When you install OS/2 on your system, all but a few of these 134 files are transferred to your hard disk. About 60 of them end up in the root directory.

What on earth are all these crazy files? And is it really necessary to keep 60 OS/2 system files in your root directory?

To answer these questions I'm going to take you on a two-part tour, exploring the various files that compose OS/2 1.0. In this installment, I'll show you how you can begin to better organize your hard disk to accommodate OS/2 after you've run IBM's installation program. In the next issue, I'll show you how to make sure the cleanup is complete, and I'll discuss the OS/2 files you can remove from your hard disk and never know they're missing.

If you're a little leery about moving OS/2 system files around so soon after installing this brave new operating system, that's OK too. At least you'll have a better idea of what all the files do and how they fit in with the rest of the system.

A few notes are in order before we begin exploring.

Versions of OS/2 1.0 available from manufacturers other than IRM are likely to use different installation procedures and may store files in different subdirectories. Although all versions of OS/2 1.0 are basically the same, some of this discussion may not apply to non-IBM versions. When I refer below to the AT, I really mean both the IBM PC AT itself and the IBM PC-XT Model 286. When I refer to the PS/2. I mean the IBM PS/2 Models 50.

PRODUCTIVITY INDEX

PC LAB NOTES Advice on organizing OS/2 files on

your hard disk at installation time. UTILITIES TOUCH changes a file's date and time

without opening the file up. ENVIRONMENTS The just-released OS/2 has tools for writing assembler programs.

POWER PROGRAMMING A MASM output-formatting routine with some functions of C's printf. SPREADSHEET CLINIC The Boolean way to rank values in a column; quick return trips to cells.

USER-TO-USER Sounding out RAMdisk accesses; making batch files interactive.

POWER USER Tiny type on Epsons; canceling print jobs; foreign ZIPs in dBASE.

LANGUAGES ANSI commands from Turbo Pascal; OuickBASIC checkup on the printer. PC TUTOR

The evolution of DOS and OS/2, and the high cost of the missing links. CONNECTIVITY CLINIC Using RAMdisks for more-efficient

networks; specialized LAN programs; ARCnet without a hub.

60, and 80. These are the IBM machines on which IBM's version of OS/2 runs.

In all the commands shown below I'm assuming the default drive is C:. I've written the commands so they are not affected by the current directory.

I must also assume here that you have a basic familiarity with DOS directory organization, the AUTOEXEC BAT and CONFIG SYS files, and the CD, MD. COPY, and FORMAT commands. I'll also assume you're familiar with the concepts discussed in my feature story on OS/2 which is contained in this issue.

REFORE VOILINSTALL OS/2 IRM's OS/2 manual recommends that you make a bootable DOS diskette before you begin your installation of OS/2. That's excellent advice and you should follow it. You'll probably find that you have at least one or two programs that simply will not run under the DOS Compatibility Mode of OS/2. You'll need to be able to boot up DOS from a diskette in order to continue using

these programs. (And if you're still a little uncertain about jumping into OS/2 with both feet, see the accompanying sidebar.)
To make a diskette that boots up with the version of DOS 3.x you have on your hard disk, you enter the commands

FORMAT A: /S COPY \CONFIG.SYS A: COPY \AUTOEXEC.BAT A:

It's possible that some of the statements in your CONFIG.SYS and AUTOEXEC BAT files that refer to directories or files on your hard disk do not explicitly refer to drive C:. If so, change the CONFIG.SYS and AUTOEXEC.BAT files on your DOS boot-up diskette to use drive C:.

After installing OS/2 we'll be looking at the files it has stored in the root directory. This will be easier if the root directory is cleared of all other files before you begin installation of OS/2. You can do this by executing the following commands from the root directory:

MD \DOSROOT
COPY *.* \DOSROOT
DEL *.*

Again, if any statements in the CON-FIG.SYS or AUTOEXEC.BAT files on the bootable DOS diskets you prepared refer to the root directory of the hard disk, change those statements to refer to the C\DOSROOT subdirectory.

As a check, try booting DOS from the diskette you've prepared. If everything looks OK, begin installing OS/2.

NO MAGIC The program that IBM provides to install OS/2 1.0 on your hard disk is fairly simple. You put the diskette marked "Installation" in drive A:, reboot, and follow the instructions.

Nothing very magical happens during installation of OS/2. The installation executes a SYS command on your hard disk to replace the hidden IBMBIO.COM and

OS/2 Installation IBM's Way

Mostly external commands and	
device drivers	
"Introduction to OS/2" program	

\OS2\INSTALL Installation aid
\SPOOL Temporary print

When IBM's installation program for OS/2 is used, these subdirectories are

spooler files

IBMDOS.COM files with their OS/2 versions. The program then creates a few subdirectories and copies files. The most helpful part of the installation is the creation of a CONFIG.SYS file, an AUTOEXEC

a CONFIG.SYS file, an AUTOEXEC
BAT file, and an OS2INIT.CMD file
(which is the equivalent of AUTOEXEC
BAT in OS/2 sessions).

After you've installed OS/2, spend some time getting familiar with it. Try out your DOS programs under OS/2's DOS Compatibility Mode to see if they run OK. If some of them do not, well, that's why you made a DOS diskette.

Although the OS2 installation creates an AUTOEXEC BAT file for use in OS2's DOS Compatibility Mode, you'll want to replace it with an AUTOEXEC BAT file very similar to the one you have been using under DOS. Note, however, the PATH statement of your DOS AUTOEXEC. BAT file you have probably listed the directory in which you have kept the DOS external commands. That directory should be changed to COSD.

OS/2 DIRECTORIES After OS/2 installation is completed, the new subdirectories created on your hard disk will be those shown in the table "OS/2 Installation IBM's Way." If you follow the procedure outlined in this article, you'll end up instead with a subdirectory organization that looks like that shown in the table "A

Better Approach to OS/2 Installation."
You can, of course, reorganize the directories any way you want, once you understand the implications of putting certain files in certain directories. That's one of the purposes of this article. The organization I show here is merely an example.

If something goes amiss during this process (for example, if you make a mistake while editing CONFIG.SYS) and you find you can no longer book OS2 from your hard disk, remember you can always boot up DOS from the botable DOS disk-ette. You can also boot up DOS from the OS2.2 "Disket I." If worst comes to worst, you can put the OS2.2 "Installation disk in drive A: and enistall DOS.

And should you decide that converting your system to OS/2 is a little premature, you can put your DOS diskette in drive A: and reinstall DOS on your hard disk with the SYS command.

A Better Approach to OS/2 Installation

Directory	Contents	
\OS2	No files	
\OS2\PRG	Programs (mostly external com- mands and other executable files)	
\OS2\DLL	Dynamic link libraries	
\OS2\SYS	Device drivers	
OS2/LIB	One import library	
OS2\DCP	Code page files	
OS2/INTRO	*Introduction to OS/2 program	
OS2/INSTALL	Installation aid	

Rather than simply dumping files in the root directory, a more disciplined approach will yield a more logical disk setup.

Temporary swapper

and spooler files

TEMP

THE DYNAMIC LINK LIBRARIES After installing OS/2, you'll find that your root directory contains 17 files with the extension .DLL. These files are "dynamic

link libraries. Dynamic link libraries are a very important structural component of OS/2. These files contain the entry points and code for many of the OS/2 function calls that programs make. (Some function calls go directly to the hidden file IBMDOS .COM.) Programmers can create their own dynamic link libraries that effectively extend the functionality of the operating system. A program can call functions in these new dynamic link libraries just as it calls operating system functions. Indeed, the Presentation Manager component of OS/2 1.1 and IBM's OS/2 Extended Edition will be little more than a set of dynamic link libraries that extend OS/2 beyond

the kernel functions.

The table "OS/2 1.0 Dynamic Link Libraries" shows what you get in the OS/2 1.0 package. The first six files listed in the table are designated as supporting "DOS" functions because the function names begin with the letters "DOS." They are not used by PC-DOS programs, however. They are used only by OS/2 programs.

They are used only by OS/2 programs. You'll note that there are two .DLL files each for the keyboard, mouse, and video. This structure allows an application program essentially to replace parts of these systems with its own dynamic link library. This is one way in which a program can intercept and modify keyboard, mouse, and video handling in a particular session

session.

I confess I don't myself know very much about the last three files on the list. They were not included in the beta releases of OS/2 I've been working with. These dynamic link libraries are used by the Program Selector, the "Introduction to OS/2" program, and the installation program.

If OS/2 runs short of memory, it can discard DLL code segments and reload them later.

We'll have to wait for IBM's OS/2 Software Development Kit to see if the entry points to these dynamic link libraries are documented.

MOVING DLLs FROM THE ROOT The 17 dynamic link library files do not have to be in the root directory. Instead you can move them to a new directory called \OS2\DLL like this:

MD \OS2\DLL COPY *.DLL \OS2\DLL

You can execute these MD and COPY commands either in an OS/2 session or in the DOS Compatibility Mode session. Having moved these files, you must

Having moved these files, you must now change the CONFIG.SYS file to specify the new directory containing the dynamic link libraries. (Unless you have a

text editor that runs in OS/2 Mode—and by the time you read this, one may be available—you'll have to make this change to CONFIG.SYS in DOS compatibility mode. Unfortunately, Microsoft didn't bother to convert EDLIN to OS/2 Mode or give us better editor.)

The LIBPATH statement in CON-FIG.SYS indicates the directory or directories where dynamic link libraries are stored. The installation program inserts the following LIBPATH statement in CON-FIG.SYS:

LIBPATH = c1\;c1\os2;c1\os2\INSTALL; Since there are no dynamic link libraries in the \OS2 or \OS2\INSTALL directories, you can simply change this line to

LIBPATH = C:\OS2\DLL

Now you can delete all the .DLL files from the root directory:

DEL *.DLL

Well, the effect of that DEL command was interesting, wasn't it? Rather than delting any of the .DLL files for you, OS/2 instead displayed an error message saying. "The process cannot access the file because it is being used by another process."

Hmm.

Many of the dynamic link libraries are used by the various programs that run under OSZ, including the Program Selector and the CMD.EXE command processor. If OSZ runs short of memory, it can discard dynamic link library code segments from memory and relead them later. If a DLL file were to be missing when OSZ attempted to reload the code segments,

OS/2 1.0 Dynamic Link Libraries

DLL filename	Size	Function			
DOSCALL1.DLL	9K	Entry points for some "DOS" functions not in IBMDOS.COM.			
MONCALLS.DLL	7K	Entry points for "DOS" functions supporting device monitors.			
MSG.DLL	6K	Entry points for "DOS" functions for getting and showing messages.			
NLS.DLL	5K	Entry points for "DOS" functions for national language support.			
QUECALLS.DLL	11K	Entry points for "DOS" functions for interprocess queue support.			
SESMGR.DLL	24K	Entry points for "DOS" functions for support of sessions and the Program Selector.			
SPOOLCP.DLL	10K	Helper module for print spooler.			
KBDCALLS.DLL	7K	Entry points for keyboard input functions.			
MOUCALLS.DLL	6K	Entry points for mouse input functions.			
VIOCALLS.DLL	14K	Entry points for video I/O functions.			
ANSICALL.DLL	4K	ANSI screen and keyboard module.			
BKSCALLS.DLL	6K	Basic keyboard system.			
BMSCALLS.DLL	зк	Basic mouse system.			
BVSCALLS.DLL	32K	Basic video system.			
CPISPFPC.DLL	109K	Used by Program Selector.			
DTM.DLL	2K	*Introduction.to OS/2" program,			
STXTDMPC.DLL	13K	and Installation program.			



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Volume 7 Number 7 April 12, 1988

Command List for EDLIN Line Editor

Many EDLIN commands require a line number. This can be a number from 1 to 65529, a period (.) to indicate the current line, or a pound sign (.e) to indicate the line after the last line in memory. You can also specify a line number relative to the current line using + or - To enter a control character, press ^0 \(Cort \) (Vollowed by the

desired character in uppercase.

desired character in uppercase.

EDLIN attempts to read the entire file into memory. It stops reading
when memory is 75 percent full. If the entire file is loaded, you will
see the message "End of input file." In order to edit the text not
loaded, you must use W to write some lines back to disk and A to
ascend more lines from disk.

A—Append Linea (Read lines from disk; only used if entire file

SYNTAX: [e] A [n] = no. of lines to read from disk

C—Copy Lines

SYNTAX: [flee1].[flee2].flee3[,cowr]C [fine1].[fine2] = range of fines to copy FROM. Both default to

current line
line 3 = line to copy TO. Becomes current.
[count] = no. of repetitions. Default: 1.

EXAMPLE:, + 10,100,3C (Inserts three copies of lines from

current to current + 10 at line 100.)

D—Delete Lines

SYNTAX: [line1][,line2]D [line1] = starting line. Default: current

[line2] = ending line. Default: line1. Line after deleted range becomes current. EXAMPLE: 10,12D (Deletes lines 10 to 12.)

SYNTAX: [//ne]

Ann Ine to edit. Detault: line after current. Becomes current EXAMPLE: 10 (Edits the line 10 before current.)

Editing keys used within Edit Line command: Del—skip one character in saved line

Esc-cancel changes to current line
F1—copy one character from saved line into current

Right Arrow—same es F1 F2 - charecter—copy all characters to character from saved line into current

F3—copy all remaining characters from saved line into current F4 - character—skip all characters to character from saved line F5—make current line into saved line

Ins-toggle insert mode

E-End Edit (Save file, make old file into .BAK)

SYNTAX: E

-Insert Lines

I—Inaert Linea SYNTAX: [trae]t line = line to insert before. Default; current. Last inserted line

becomes current.

Note: Press Ctrl-Break to end Insert Lines mode

EXAMPLE: 301 (Inserts Inse before line 30).

L—List Lines (Display lines without changing current line) SYNTAX: [Ine1] [.ilee2]L Jine 1] = starting line. Default: current - 11.

[line2] = ending line. Default: current + 11. EXAMPLE: -5,+5L (List five lines either side of current.) M-Move Linea

SYNTAX: [/iee1]_[/iee2]_/ine3M [/ine1]_[ine2] = Range to move FROM: Both default to current line3 = line to move TO. Becomes current.

EXAMPLE: 100,110,20M (Moves lines 100 thru 110 to line 20.)

P—Pege (Display lines; lest displayed line becomes current)

SYNTAX: I/lies11. //ies21P

[(ine1] = starting tine Default: current + 1. [(ine2] = ending line. Default: current + 23. EXAMPLE: P (Lists from current + 1 to current + 23.)

Q-Quit Edit (Abandon any changes to file) SYNTAX: 0

R—Replace Text SYNTAX: [flee1][,fine2][?]R[string1][^Zstring2]

| [ine 1] = starting line Default: current + 1. | [ine 2] = ending line. Default: tast line in memory. | [2] = confirm each replacement

[etring1] = text string to search (case sensitive) [string2] = replacement string | Note: Press For ~ 2 to separate the two strings. Line with last found string becomes current. | EXAMPLE: 4, Ploat ~ Zdog (Replaces "cat" with "dog" | XAMPLE: 4, Ploat ~ Zdog (Replaces "cat" with "dog" | XAMPLE: 4, Ploat ~ Zdog (Replaces "cat" with "dog" | XAMPLE: 4, Ploat ~ Zdog (Replaces "cat" with "dog" | XAMPLE: 4, Ploat ~ Zdog (Replaces "cat" with "dog" | XAMPLE: 4, Ploat ~ Zdog (Replaces "cat" with "dog" | XAMPLE: 4, Ploat ~ Zdog (Replaces "cat" with "dog" | XAMPLE: 4, Ploat ~ Zdog (Replaces "cat" with "dog" | XAMPLE: 4, Ploat ~ Zdog (Replaces "cat" with "dog" | XAMPLE: 4, Ploat ~ Zdog (Replaces "cat" with "dog" | XAMPLE: 4, Ploat ~ Zdog (Replaces "cat" with "dog" | XAMPLE: 4, Ploat ~ Zdog (Replaces "cat" with "dog" | XAMPLE: 4, Ploat ~ Zdog (Replaces "cat" with "dog" | XAMPLE: 4, Ploat ~ Zdog (Replaces "cat" with "dog" | XAMPLE: 4, Ploat ~ Zdog (Replaces "cat" with "dog" | XAMPLE: 4, Ploat ~ Zdog (Replaces "cat" with "dog" | XAMPLE: 4, Ploat ~ Zdog (Replaces "cat" with "dog" | XAMPLE: 4, Ploat ~ Zdog (Replaces "cat" with "dog" | XAMPLE: 4, Ploat ~ Zdog (Replaces "cat" with "dog" | XAMPLE: 4, Ploat ~ Zdog (Replaces "cat" with "dog" | XAMPLE: 4, Ploat ~ Zdog (Replaces "cat" with "dog" | XAMPLE: 4, Ploat ~ Zdog (Replaces "cat" with "dog" | XAMPLE: 4, Ploat ~ Zdog (Replaces "cat" with "dog" | XAMPLE: 4, Ploat ~ Zdog (Replaces "cat" with "dog" | XAMPLE: 4, Ploat ~ Zdog (Replaces "cat" with "dog" | XAMPLE: 4, Ploat ~ Zdog (Replaces "cat" with "dog" | XAMPLE: 4, Ploat ~ Zdog (Replaces "cat" with "dog" | XAMPLE: 4, Ploat ~ Zdog (Replaces "cat" with "dog" | XAMPLE: 4, Ploat ~ Zdog (Replaces "cat" with "dog" | XAMPLE: 4, Ploat ~ Zdog (Replaces "cat" with "dog" | XAMPLE: 4, Ploat ~ Zdog (Replaces "cat" with "dog" | XAMPLE: 4, Ploat ~ Zdog (Replaces "cat" with "dog" | XAMPLE: 4, Ploat ~ Zdog (Replaces "cat" with "dog" | XAMPLE: 4, Ploat ~ Zdog (Replaces "cat" with "dog" | XAMPLE: 4, Ploat ~ Zdog (Replaces "cat" with "dog" | XAMPLE: 4,

throughout lext.)

SYNTAX: [/liee1][/liee2][?]S[strisy] [live1] = starting line Detault: current + 1. [live2] = ending line Detault: last line in memory

[7] = stop after each found string [string] = last string to seerch (case sensitive) Note: Line with last found string becomes current. EXAMPLE: 1,9Scat (Finds occurrences of "cat" in lines 1 to 9.)

T—Trensfer Lines (Read other file into file being added)
SYNTAX: [Iline] [Ilinemme]
Wheli = line to insert before. Default: current Becomes current

[d'] = drive on which to find file
Nename = bie to insert

EXAMPLE:TC:foo (Reads bie "loo" into text at current line.)

W—Write Linea (Write lines to disk; used only it entire ble not loaded)
SYNTAX: le IW

[n] - no. of lines to write back to disk



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however, the results would be disastrous. For this reason, none of the dynamic link libraries that are currently being used by programs running under OS/2 can be deleted from the root directory or renamed. Similarly, any program file currently running under OS/2 cannot be deleted from the root or renamed.

The solution? Just reboot. The LIB-PATH statement now causes OS/2 to load the DLL files from the \OS2\DLL directory rather than from the root directory. Now you can then delete the .DLL files from the root directory:

DEL *.DLL

That's better.

THE SWAPPER FILE You'll notice in your root directory the presence of a 512K file ealled SWAPPER.DAT. This file is created the first time you boot up OS/2. As you may know, OS/2 supports virtual memory. This means that if OS/2 runs short of real memory, it can save blocks of memory to a hard disk file to free up space. It can then reload the memory segments from the file later. This is known as swap-

The system initially creates SWAP-PER.DAT so that OS/2 always has a 512K area of the disk in which to swap. If OS/2 needs more than 512K for swapping, this

file will grow in size.

directory, you might want to create a directory called TEMP specifically for such temporary files. First, create the directory:

MD \TEMP

In the CONFIG.SYS file, change the SWAPPATH statement to indicate that OS/2 should use this new directory for swapping:

SWAPPATH = C:\TEMP

Now delete SWAPPER.DAT:

DEL \SWAPPER.DAT

Oops! Sorry, I did it to you again. I told you to delete a file that cannot be deleted. Rather than keep this file in your root | Can you imagine the problems that could

PUTTING YOUR TOES IN THE OS/2 WATERS

statements

Ithough the IBM OS/2 installation A lthough the 1BM Gov2 mountain this option, it is possible to leave DOS installed on your hard disk and boot OS/2 from a diskette. (What is not possible-at least under normal conditions-is to leave DOS installed on one hard disk partition and install OS/2 on another bootable partition.)

If you'd rather leave DOS on your hard disk and boot OS/2 from a diskette. however, I have one warning: it's slow. OS/2 is big and (as you've seen) many files are involved in the boot process. But you can do it.

The IBM OS/2 package comes with four diskettes labeled "Installation Diskette," "Diskette 1," "Diskette 2," and "Diskette 3." Both the Installation Diskette and Diskette 1 are bootable. Booting the Installation Diskette begins the hard disk installation program; booting Diskette 1 does not. Diskettes 2 and 3 contain mostly external commands and user-installable device drivers. Diskette 3 also has the "Introduction to OS/2" program, in a subdirectory named \INTRO.

So, begin by creating the following three directories on your hard disk:

MD C:\OS2 MD C:\OS2\INTRO

MD C:\TEMP

Put Diskette 2 in drive A: and execute

COPY A:\ C:\OS2 Put Diskette 3 in drive A: and execute COPY A:\ C:\OS2

COPY A:\INTRO C:\os2\INTRO Make a copy of Diskette 1. This will become your boot diskette. On this copy of Diskette 1, create an OS2INIT.CMD

file with the following statements: PATH C:\os2 DPATH C:\OS2

Create an AUTOEXEC.BAT file with at least the following statements: PATH C:\os2

APPEND C:\os2 PROMPT \$P\$G Create a CONFIG.SYS file with the

BUFFERS = 38 SHAPPATH - C:\TEX PROTSHELL = DMPC.EXE SHELLIF.CMF SHELLIF.EXE CMD.EXE /K OS21917.CMD SHELL = COMMAND.COM /F /E:1824

The line beginning with PROTSHELL = must be a single line.-Ed.1 Now you

can boot OS/2 from this copy of Diskette I and use all the OS/2 external commands in either OS/2 Mode or DOS Compatibility Mode. You should leave the diskette in drive A: while you're using OS/2, however,

If you want to speed up the boot process, you can move some files from your boot-up copy of Diskette 1 to your hard disk. For example, to move all the dynamic link libraries to the hard disk, you ereate a directory for them and copy them over, thus:

MD C:\os2\DLL COPY A: *.DLL C: \OS2\DLL

Now add this line to the CONFIG.SYS file in Diskette 1:

LIBPATH = C:\os2\DLL

This allows OS/2 to load the dynamic link libraries from your hard disk rather than from drive A:.

You may also want to move the COMMAND.COM and CMD.EXE command processors to an \OS2\PRG subdirectory on drive C: and change the SHELL and PROTSHELL statements in the CONFIG.SYS file to reflect the new

PROTENELL - DMPC.EXE SMELL11F.CNF SHELL11F.EXE C:\OS2\PRG\CHD.EXE /K OSZINIT.CHD

SHELL = C:\OS2\FRG\COMMAND.COM C:\OS2\PRG /F /E:1624

(What follows PROTSHELL = and SHELL = should be entered as single lines .- Ed.] You can also use the same reorganization of the hard disk directories as described in the accompanying article -Charles Petzold

■ PC LAB NOTES

result if OS/2 allowed you to delete a swap file? I don't want to try.

So, reboot again. This time, another SWAPPER.DAT file will be created in the VEMP directory. Now you can delete the one that is in the root directory by typing the following:

DEL \SWAPPER.DAT

If you're ever desperate for another 512K of hard disk space, you can tell OS/2 to perform no swapping at all. You can inhibit swapping by changing the MEM-MAN ("memory management") statement in CONFIG.SYS. Normally it looks like this:

MEMMAN = SWAP, MOVE

You can change it to

MEMMAN = NOSWAP, MOVE

After you reboot, you can delete SWAP-PER.DAT from the TEMP directory. But

it's best to leave swapping enabled in most

The OS/2 print spooler program also creates temporary files. You can specify that SPOOL.EXE also store its temporary files in the \text{TEMP directory by changing the CONFIG.SYS line that reads

- RUN = C:\OS2\SPOOL.EXE /D:LPT1 /O:LPT1
 to the statement
- RUN = C:\OS2\SPOOL.EXE C:\TEMP /D:LPT1

The above should be typed as a single fine—ELJ Athough SPOOL EKE is a normal OSZ program. It can be run from CONFIG. SYS because it does not display any output on the screen and because it does not require any keyboard input. SPOOL EKE installs a "printer monitor" to capture all printer output, save it to files, and transfer the files to printer "in the background." SYOOL EKE separates the

printer output from different programs with a form feed.

Because you've now directed that spooler files be stored in the \TEMP directory, you are able to remove the \SPOOL directory that the installation program created, thus:

RD \SPOOL

PARTWAY HOME The changes described so far are but the first part of a systematic approach to installing OSY2 on your system. Hopefully, these hints will help you organize your systems a little better than IBM's default. In the next installment well more some more files and finish the job we've started. And then we'll continue with a discussion of what can be removed entirely without affecting your poperation at all.

Charles Petzold is a contributing editor of PC Magazine.

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REACH OUT AND TOUCH YOUR FILES



Bell Labs' UNIX system provides a TOUCH utility that lets you update the time and date fields of your files. Here's a handy equivalent for your PC.

ow many of your files carry the date 1-1-80? The only thing good it's wrong. Certainly it makes a hash of things when you sort directory listings by date. The date/time stamp that DOS attaches whenever you write to a life can be wonderfully useful when backing up files

or when tracing a sequence of revisions, but there are occasions when its inflexibility is a curse.

Wouldn't if he nice to be able to impose

your current system date and time on a file without resorting to the crude (and sometimes impossible or dangerous) practice of opening it, changing a byte, and closing it

 again? Or to give a file any date and time you choose? That's the purpose of this issue's TOUCH utility.

GETTING IN TOUCH You can create your own copy of TOUCH.COM either from TOUCH.ASM or from TOUCH .BAS, both of which are listed here. The



TOUCH.ASM: The assembly language source code for TOUCH.COM.

UTILITIES

	CHP CHP	AL, CB PLLESPEC	:Else, retrieve switch. Did user out character? If wes. done here.	F180_F1184	80V 80V 18T	CX,7 AN,4EN 218	Pattribute of all files.
	AND CAZ	AL, SPE AL, "D" CE TIME	:Eler, cepitalisa.		JVC MOV	TOUCS FILE DE,OFFRET BOT FOUND HIS SECRET MESSAGE SKIT	off found, change date/time.
	OR CALL	PARKE LEADING	iff no, check if time. Iff no, check if time. Iffine, flag that dete recluded. Pares off leading delimiters. Jost first marker.	PIGO MENTA	NOV	AN. 679	(Pind next matching fair)
	JE	DAD PARAMETER	Out first marker. Two it a serv or a E_Ptel' If wes, ext. else store nonth.		164	218 6000 EXIT	of fauled, we're done.
	CALL JX	DE, BL. ONT NUMBER BAD PARAMETER	plet nest mester.	TOUCE_FILE:	NOV SOV	AX, TOPRE FILE HAME AX, TOPRE	; If failed, we're done. ; Else, open file for reading ; to get a filehandle.
	CALL	DE, BE GRY REPORTS BAD TANAMETER	off yes, exit, also still lay. 	1	MOV.	EX,AM CR. BYDTES, TIME	Filshandle meeds to be in 8%.
	HOV CALL HOV	CK, iiX	:If yez, exit, clse store year. :Convert decimal to compressed ; her number and store.	1	HOV HOV	AL, SMITCE FLAG	to system date and tiper Natrieve the switch fine Wes there a mystch?
TIME	JMP CMP	SMITCH DATE, DR	Check for snother swatch.		JE 2007 TEST	CK, BHITCH TIME CK, BHITCH TIME AL. TIME FLAG	ities, secure it a time reques
	DIS CALL	PIND SWITCH SWITCH PLACETHY FLAC PARKE TRACETORS	off no, check next byte. Stime, flag that time included. Sendle same so date.		290E 9099	DO DATE CH,FILE_TIME	off yes, sesumed right.
	CALL HOV CALL BOY	CET NIMBER CET NIMBER DC. RI.	istage hour in DA.	DO_DATE:	TEST JHE	DE, ENSITE DATE AL, DATE PLAS SET BASE TIME DE, PILE DATE	passing there was a date leque year there a data switch? yif yes, assumed right. (Else, use file's date.
	CALL	GET MUMBER CA, DA	Store hear and minutes in CX.	SPT DATE TIME	1007	TOUGH TIME, CE	. Town date and time for
	EOV CALL BOY	EN, BL CONVERT TIME SWITCH TIME, DK	(Store seconds in DR.	SPT_DATE_TERM	1077 1077	TOUCH DATE, DE AX, 57 ELE 215	; display purposes. ; set file's date and time.
	269	SHORT PLED SWITCH	Check for next swatch.		\$c	SYNTAL EXIT	; If failed, exit with m-samp.
				CLOSE_PILE:	INT CALL	AN, 3EH 218 DESPLAY HARE	pClose the file.
Laly ped for	short	compa to arror exit.)			JHP	BROST FIND HENT	Display complets state of file
PARAMETES:		path delimiters. Convertend (1), change to reg	Exerce Sampling address.	Bispley error working dire	ectory a	ope and TOUCH system If mend default drive and direct from the problems error code of	readity. Sectors ; ettery. Exit with ; sero if all went well. ;
TERMECT.	MOV CMIA	BI, BIE PARSE_LEADING	iPoint to command line parameter. Parse off leading delimiters. Plays start of filename.	STOTAL COLT.	900 197	DX,OFFSET STATEMENT AX.7	;busplay "Invalid perameters".
ep (190)	FUGS EGG LGGSB	81,83	prove exact of filerane. prove ex as path specifier flag. prot a Dyte. ple it a drive delimiter:		HOW	DR, OFFERT STREAM AM, 9 21E	(Display fouck system resistant
	CHP	CK PATE			2107	AL,1 SSOWY EXIT	gast with error code of 1.
	AND AND	06, [83-2] 05, 970	relam, retrieve drive aperification (Capitalisa. (Convert to 800 firmat.	GOOD_EXIT:	XOR POSS	AL, AL	:Exat with error code Af 7.
	80V	AN, SEN	¿Change drive.	Lan.	807	DR.OFFEET MORETHG DIN	Pestore working directory.
	JEP	80,81 88097 F180_E80	(Bave se pozerble filename stort.		INT MOV	218 EG, CURRENT DIRE AX, RES	Restorm default drawe.
PATE	262 800	AL. "\" CK_DELIMITER BR.BI AL. "/"	/Is it a path delimiter? If no, check switch character.	1	1877 1607 1607	DR. OFFERT CURRENT DIR AX. 388	:Restore default draw disects
ORLIEITES:	CHIP		rElms, save on possible filename. rIs it a switch delimiter; rIf yes, and of filespor. rIs it above spore character?		INT	218	shut mana arror code.
	CHP	AL, SPACK FISO ESO STITE PER (SI-1), 2	:In it above space character? :If yes, continue until fand end.	1	HOV INT	AK, OCE	Terminate.
IND_END:	897	STTE PTR (81-7), P	illes, convert to AG2112.	MALE	DOF		
izee the woo	king de found,	fault directory at we ca change to requested direc	restore it on exit. ;			BOOTINES */	
	907 907 208		. DOS doesn't preface directory 1 with sleah No we must.	1 19907 1 CX - Test	(1988	- 2079)	
	1NT DOM	Aff, 476 218	:Out current directory : of working drive. :Describe Silvaper start.	CX - Test DH - Mosti CL - Day	(1 -)	12)	1
			(Was there a path specified)	2 DX = coops		date is directory entry fo	cent.
		person was comed to a	:FAS it A drive specifist only?	11 :	0E	,	
	CMP 28	PIND FILE		11		pay (0 - 119) noth (1 - 12) ny (1 - 31)	;
	CMP 23 PURR CMP	FIND FILE BYTE FIR (BR-1 .")" FIND FILE BR BYTE FIR (BR-1),"1"	:Blee, save as filenameraturt.			oth (1 - 12)	,
	CHP JS PURS CHP JS CHP	BYTE FTR [DR-1], "1" CRANGE DIS BYTE FTR (RE-2), SPACE			4 - 64	ey (1 - 31)	
	CMP JS PURS CMP JS CMP JSE DEC	BYTE FTR [DR-1],"1" CHANGE DIS BYTE FTR [BE-2], SPACE CHANGE DIS BR		BX, CR Set			
N918_01A+	CMP JE PORR CMP JE DEC PORR BOY HOT	BYTE FTR [DR-1], "1" CRARGE DIS BYTE FTR [BE-2], SPACE CRARGE_DIS BY GEZ] STEE FTR [BE], # AS.348	psies, save as frienare start. 18es 14 "d" "? 15 yes, no edyagt. 18es 14 plan root "1"? 15 yes, no edyagt. 18les poont in path delimater. 18ee first byte of filmase.	1	atroped.		
MAGE_DIR:	CMP JE PORE CMP JE CMP JEE DEC PORE R/V HOV 18T	BOTE FTR [BR-1],"1" CHANGE DIS BYTE FTR [BE-2], SPACE CRASSE DIS BOX STTE FTR [BE], & AS, 348 218	pales, save as frienzewistert. ima it "di "P; ilf yes, no edjust; ima it plan nost "t"? ilf yes, no edjust; illas pond in path delimater; inequality sarts in Acid path; imagicar just beta of filename. imagicar just beta of filename.	DA, CR Sec	PROC	NEAR	(Chescone year.
ARGE_DIR:	CMP JE PORR CMP JE DEC PORE BOY HOY HOY IST	BYTE FTR [BR-1], "1" CHANNE_DIS BYTE FTR [BR-2], SPACE CHANNE_DIS BR [BK] BYTE FTR [BK], # AG, MAR 21s	pales, save as frienzer start. 16ss 14 "0" "16 "9" 16 yes, so edysat. 16ss 14 han root "17 16 yes, so edysat. 16ss pond in path delumiter.	1	PROC GUB CMP	NEAR	;Chepress year. ;Did user abbreviate year:
	CMP JE PORM CMP JE CMP JEE DEC POM HOW HOW TET POP	BO BYTE FTR [SR-2],"1" CHANGE DIS BYTE FTR [RE-2], SPACE CHANGE DIS BO [AE] SAT BYTE FTR [BE], # AA, AB; [AE] DOI	piles, save as filenameraturt. 18m it "di "di "di "di "di 18m it pian rest ""? 18f yes, no edyat. 18m pian rest ""? 18f yes, no edyat. 18m pian rest ""? 18m pian rest ""? 18m pian rest "" 18m p	1	PROC DJB ONP JB BAD BAD BAD	NEAR CZ, 60 CN, 1346 SAVE MONTH CX, 1348 BL-26	Chepress year. Did user abbreviate year: If yes, ob. Else, sobject century park, store month in St.
ANNUE DIR: Heady for hundred false for year measage, if	CMP JS PORM CMP JS CMP JS SME DEC MOV MOV INT POP PLOP REDPAR SME DEC MOV MOV INT POP PLOP REDPAR SME DEC MOV MOV INT POP REDPAR SME DEC MOV	BOYTE FTM [DAT-1, "1" COANDE DIE COANDE DIE BOYTE FTM [BE2], SVOCE BOYTE FTM [BE2], SVOCE BOYTE FTM [BE2], S	pales, save as frienzewistert. ima it "di "P; ilf yes, no edjust; ima it plan nost "t"? ilf yes, no edjust; illas pond in path delimater; inequality sarts in Acid path; imagicar just beta of filename. imagicar just beta of filename.	CORVERT, DATE	PROC GUB CMP	NEAR	;Chepress year. ;Did user abbreviate year:

	HOV ENL OR RET	EL,5 EX,CL EX,EX	; shift meeth left 5 bits. ; Add year and month to doys.	That is. fill Beselte are	ename in	o pos DIR format. pyles, date and time. to display.	
DEVORT_DATE	EHOP			PILE SIEE		TOUCH BATE TOUCH TIME CR_LP	
IMPUT CS + Sour	(9 -	221		PILECOLE	atox	CR_LP	
CL - Ricuta DS - Secon	19 (9 -	591 591		1 STORE_WORK		- 1	
		me in directory entry fo	rrest.			DIR atyle format.	
5 6 6	b b m :	>	1			I, DI dastroyed.	
	h + hou n - nlo	or (9 = 23) notes (9 = 59) n-smeand increments (6 =		DOSPEAT_NAME	PROC	NUAR SI.OPPERT PILE SAME	(Point to filaname.
BX, CR des	Lreyed.	-emeand increments (# -			MOV MOV	DI, OPPRET RESULTS AL, SPACE CO, 65	And atorage area. Initiate storage with spaces.
CONTENT_TIME		FEAR			NOV NOV	STORE SI, OFFERT RESULTS CE.12	Foint to start of storage agai Store 12 bytes of filename.
	NOV NOV	AZ,CZ	ifters hour and mis. in he so we	SERT_STORE:	CHP		; Get a byta.
	E RIN	CL. 3 DO. CL. CL. 3	; can use CL as shift register. :#ight justify; divide eacs by 2. :Zustify left hour.	ţ	2X CHP	END STORE	iff yes, figure with blanks.
	S SEL	CL. 3 88, CL 09, 80	store bour in his	1	JVX SUB	STORE BYTE	:If no, atora.
	MOV	CL.S FE,CL	/Justify synetes.		ANP	AL, SPACE STORE	
	OR BET	OR, BX	;Add minutes to hour and s-conds.		ADO JHP	CX.3 SBORT NEXT_STORE	just meet byte.
CONVERT_TIME	EHOP			STORE_STTE:	STORE LOOP	MENT STORE	ofters byte. yout nest byte. ired belance with spaces.
IMPUT		NIII number etring. :		END_STORE:	REP	AL, SPACE STORE	
OFFFIT	ne trans?	umber.			PUSS ACO	01	:Enve pointer. :Howe to end of bytes field.
DE-RI poin	te to b	ple after string. :			MOV	De, FILE SIEE LOW AB, FILE SIEE SIGE	: Metrieve high end low words : of hytes. : Convert to decimal.
If (MP) *	: ::	uoi i			9077 8770	AE, 19	
AX, 89, CB	. 30 de	treyed.		SEXT_BIXE:	NOV 600	Ce, De	Low word in Co.
SET MINNER	PROC	traa .			DIV	BX AX. CR	Convert to decimel.
NT_PURISER	208	PEAR BY.AX	oftert with maro.		01V 00V	EX AN, DR	:Matriere remainder.
PARKE_DELEMENT		DI. OFFEET DELINITERS	Start with earo. Get e byte. Is it a delimiter?		ADO STORE	A5. *9*	Convert to ASCII.
	MOV MOV	CX,3	It is a measured?		909	AX, C+ C+, DX	tyte ne godej
	31	PARSE_DELIRIT	:If yee, get nest byte-		760	SEST_SISE	ilf no, divide again.
SEET_SUMBERS	90K	CL,18 AM,AX	;mere is high helf.		POP ADD	01	Feck to forwerd direction. Fetrieve pointer. Nove to date field.
	2 P	AL, CR SURRER END	In byte a carriage raturn? If yes, dons. In byte a number?	DATE	HOV	DI, 11 DX, TOUCH DATE	:Nova to date field. :Retrieve date.
	Z¥	AL, -5-	; le byte e number?			AX, DE CL, 5	shift to lowest hits.
	CMP ZA	AL, "5" HUMBER BID	; If no, done.		EBR AND	AX, CL AX, 11119 CL, 8778	; Mark off all but month.
	ECHO.	ALS-	rElas, convert to hex.		9077 9077		:Pleg ea no landing seros. :Delimiting character.
	MIL	C. H.			CALL	STORE_MORD	:Store it.
	Looms	SHORT BEST PURSES.	; Add new number. Beat byte.		AXD eco	AX, DE AX, 111118	:Notrieve date. :Nest off all but day.
PUMBER_END:	960	er.	:Adjust pointer to delimiter.		HOV CALL	CL,CL CH,"-" ETORE MORD	(Plag include leading seroe.
	OR BUET	31,10	:set ware flag if results ware.	1	EALL.		
CET_WINKS	EMOP				H077	AR, DX CL, S AN, CL	(Metriava data for last time.
					ACO CHE	A3.11	(Adjust to ADCII.
If carriage	return .	etring delimiters. encountered, jump dirmot	ly to smit.	1	29	AN, 160 DESPEAY DATE	:If no, display. Else, adject f i nest century. Plenning about ;Display leading serce.
IMPUT		ert atriae	1	DISPLAY_DAYS:	905 907	CL,CL CH.SPACE	
orrer			1	erwe.	CALL	5704E_W080	store it.
DE:ST poin		irst son-delimiting byte	to etrang.	TIME:	HOV HOV	01 0+,70009_TIME AX,00	: Move to time field. : Petrieve time.
All regist	ers pre	sereed.					: thaft to house bate.
PARSE LEADING	PROC	SEAX.			PUSH	AX,CL AX	
	Local	AL, SPACE	Get a byta. Is it s space abor or below?		CHP JHE	AS,12 MERIDIAN	;Peet moen?
	JA CHP	LEADING_ENG	its it space abor or below? its it space abor or below? its it carriage return? its mg, get meet byta.	MENTODAX	CHP	A+,12 Ax,6	:If yee, edjust. :Hideight?
	JWE	PARKE LEADING	if mo, get most byte.		HOW	NOT RIDWEGAT	ilf yee, edject.
TEMDING END?	94C	#1	(time, immediate error exit. (Adjust pointer to eirin) etert.	MOT_BIJSIONT:	HOV HOV	CL, SFFS CH, "1" STORE WORD	: Noppress leading serve.
PARSE_LEADING	Esce				CALL	***** MOND	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,
							(TOUCH ASM conton

UTILITIES



latter does not require a macro assembler, and it creates the COM file automatically when you run it once in BASIC. The former is of greater interest if you want to know how the program works. Keyboarding either file is unnecessary, however, for you can download them—or a fully assembled TOUCH. OOM—from the FC Magazine interactive Reader Service. See the sidebar "TOUCH by Modem" for the details. Programmers who use Microsoft is dischart to the companying and inking utility MASIC and the Companying and

TOUCH uses the following syntax:

rouca filespec [In date] [In time]
If you enter TOUCH without including a
filespec (a path, if necessary, plus the filename) you'll get a help screen that displays
the correct syntax. You'll note that you can
use the two filename wildcards, the asterisk and question mark, to touch several
files at once.

If you give TOUCH a filespee but do not use either the optional Do o'T switches, the designated file(s) will be updated with the current system date and time—identical to those you give DOS with the DATE and TIME commands. The screen will then display the file's new listing in the familiar DOS DIR format, confirming the successful update.

While the default update to the current system values will probably be the normal use of TOUCH, you can designate the date and/or time stamp of your choice by using the optional switches. The date and time parameters are entered in the same format you use to give the DOS DATE and TIME commands. The date uses the month-dayyear convention. If you prefer, the forward

 Though it's too late now, Al Capone might have appreciated TOUCH's ability to predate files when he was charged with income tax evasion.

slash "/" delimiter can be used in place of the usual hyphen. The year can be entered in full (1988, for example) or in abbreviated (88) form. DOS uses a compressed date scheme l'Il explain later on that limits valid years from 1980 to 2099.

Unlike the DOS TIME and DATE commands, TOUCH does not check for valid entries. Complete error checking would entail a calendar algorithm, an addition 1 did not think TOUCH warranted. For example, TOUCH will accept an invalid date entry of 231/88, and DOS will

show it in a DIR listing even if it won't assign such a date. TOUCH does check that all three fields—month, day, and year are specified and are nonzero. If you violate TOUCH's conditions, you'll get an

The time parameter is in the familiar hournimutesseconds format. (Note: files do not recognize the DOS TIME hundredths-of-a-second parameter.) The TOUCH time parameter will accept a shortened hour-only or hournimute entry and will automatically set the empty fields to zero. For example, a time entered as TI will set a file 5 time stamp to 11 000.00. TOUCH salutes the military format; a time of 200 PM is entered as 140.00.

"Invalid parameter" message.

If only one switch is entered, the other is not touched. Entering

TOUCH myfile /D 1-12-82

will change myfile's date stamp only. Though it's too late now, Al Capone might have appreciated TOUCH's ability to predate files when he was charged with tax evasion.

Many readers may find TOUCH useful in conjunction with the DOS BACKUP putility. The BACKUP /D parameter tells BACKUP to back up files that have been written to on or after a specific date. If the files you have updated since your last backup include some big files with insignificant minor changes, for example, so that you do not want to back them up, you can predate those files with TOUCH's /D witch and then BACKUP with its /D date



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switch archiving only the selected files. The following example is a command pair that might have saved Bugsy Malone from Carone's fate:

TOUCH C:\ACCT*.TAX BACKUP C:\ACCT*.* A: /D:84-15-88

BACKUP CI\ACCT*.* A:

Of course, readers who have updated to DOS 3.2 have access to XCOPY. The reason to choose XCOPY instead of BACK-

UP to archive files to disk is that XCOPY files remain normal files at all times. BACKUP files must be restored to normal with RESTORE to make them usable with RESTORE to make them usable may are XCOPY also has at D switch, however, so you can use TOUCH and the /D switch in the same manner as you would with BACKUP—postdating or predating a file or group of files before XCOPYing.

UNDERSTANDING TOUCH In covering the logistics of how TOUCH works. I want to concentrate on two apparently minuscule programming details that could cause trouble if overlooked. One has to do with command line parsing, and the other concerns a peculiarity in the way IOOS treats directory strings.

One of the first things TOUCH does is tackle the tedious job of parsing and inter-

1214

811

851

811

1236

734

951

1484

1244

1100

...

721

944

557 871

110 OPEN "touch.CDM" AS \$1 LEN + 1 646 DATA 51. å 130 84, 180, 60, 116, 130 CHECKSES - 9 868 DATA 878 DATA 120 128, 222, 222, 234 47, 48, 198, 226, 33, 2, 32, 6, 210, 95 139 139 119 65 188 140 FOR 1 - 1 TO 235 LINESUM - 0 BEE DATE 222, 220, 5, 71, 120, 127, 32, FRINT "."; FDR J = 1 TO 8 198, 92, 285, 127, 255 198 SEE DATA READ BYTE 918 DATA 928 DATA 16 50, 33, 100 CHECKSUM . CHECKSUM + BITT LIMESUM - LIMESUM + BYTE 1F (BYTE < 256) THEN LEET AS - CHRECKYTE) 58, 116, 75, 285, 116 26 128 83, 127, 198, 1, 59, 8, 7, 114, 205, 139, 6, 2, 22, 22, 22, 114, 143 100, FUT BY 90 MEXT J DATE 186 230 READ LINECKECK 978 DATA 100 78 235 186 139 205 33, 180, 139, 166, 115, 79, 184, 14, 232, 11, IF LINECHECK <> LINESUM THEN PRINT "Extor in Line": 280 + 18 * 1 988 DATA 938 DATA 33, 250 HERT 1 150 239 1000 DATA 1000 DATA 278 IF CHECKSUM 22, 116, 117, 233 208 PRINT 1828 DATE 168, 139, 139, 137, 1 232 26, 4, 1, 0, 1, 180, 177, 186, 250 DATA 1, 14, 1, 205, 245, 49. 1940 DATE 1050 DATE 320 DATE 330 DATE 32, 241, 9, 235, 33, 176, 205, 232, 100, 1060 DATE 154 205 340 DATE 105 765 1000 DATA 1000 DATA 186 100 50 205 205 111, 235 33, 1166 DATE 360 DATA 60 184, 229 100 100 100 100 100 101 59. 14, 33, 33, 06, 129, 130, 22, 253, 76, 188, 138, 177, 360 DATA 74 84, 100, 81, 32, 32, 13, 121, 84, 100, 181 36 116 164, 1120 DATE 111, 245 205, 233, 233 233 225 450 DATA 32, 1140 DATA 410 DATA 420 DATA 1150 DATE 222 114, 50, 255 227 211 177 125, 206, 11, 234, 100, 130, 195, 241 139 218 105, 191, 97, 32, 112, 32, 101, 105, 47, 32, 1#1, 671 1170 DATE 211, 247, 51, 228, 14, 217, 448 DATE 227 450 DATA 1190 DATE 211 219, 242, 68, 22, 265, 18, 105, 105, 121, 116, 100, 116, 241 277 60 44, 235, 110, 121, 109, 100, 174, 13, 57, 36 56 114 147 49 400 DATA 45. 191. 184 225 219 13 198 1117 54 109, 246, 11, 60, 195, 3, 195, 117, 172, 116 115, 247 233, 186, 133, 178, 520 DATA 196, 1260 DATE 1270 DATE 510 DATA 102, 70 32, 121, 116 1260 DATA 1250 DATA 185 88. 243, 191 101, 116, 3, 235, 170, 0, 139, 243, 560 DATA 110. 100 105 101 1300 DATA 1310 DATA 1320 DATA 19 32 170 46, 243, 226, 12, 131, 176, 139, 10, 233 97 11 105 0, 0, 23, 133 176, 235, 87, 161, 3, 243, 154, 253, 110 159, 210, 40, 252, 15, 680 DATA 100. 100. 1348 DATE 610 DATA 620 DATA 630 DATA 105 101 116, 32, 110, 101, 110, 100, 16 1350 DATA 1360 DATA 282, 146, 117, 22, 243, 100, 111 4 50 1370 DATE 1360 DATE 227 131, 194, 177, 194, 232, 232, 197 9, 162, 150, 640 DATE 106, 205 139, 211, 45, 139, 0, 71, 101, 33, 205 33, 92, 265, 42 1390 DATA 1400 DATA 1410 DATA 139 255 656 DATE 676 DATE 232 100, 50, 194, 61, 50, 281 177 186 45 96, 5, 65, 72, 194, 8, 191, 191, 165, 249, 176, 690 DATA 105 137, 101, 243, 60, 139, 12, 190, 100, 40, 211 114 32 100 232, 139, 180, 60, 172, 22, 190 225 991 1448 DATE 13 1450 DATA 139, 718 DATE 61 118, 117, 58, 211, 728 DATE 24 222 12, 117 13 116, 120, 232, 93, 64 1478 DATE 232 61, 177, 194, 50, 115, 225, 12 12 6 43 250 232 255, 177, 201, 116, 56, 1400 DATE 100 758 DATA 760 DATE 139 211. 1050 1500 DATE 181 778 DATE 116 49 139 1510 DATA 131, 22, 788 DATA 758 DATA 14, 520 DATE 164, 44, 1530 DATE 186 133, 243, 40, 117, 195, 205, 32 53,

FROM CREATION

You've created a file or document on your PC. Now what?

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preting the command line parameters. As you probably know. DOS places the command line at 80h of the program segment prefix (PSP). The first byte contains the character count of the command string plus the following parameter string, including any delimiting space or tab characters and terminated with a carriage return. The carriage return does not count in the string

length. There are basically two approaches to scanning this string. The first technique initializes a counter with the value of the string character length found at 80h, dermenting it as each succeeding character is examined. You know you've reach the end of the string when the counter reaches zero. The second method checks to see whether, in the course of the strine parameters.

ing, the current character is a carriage return—the command string terminator guaranteed by DOS.

I usually find it easier to program a parser that keeps a lookout for the ending carriage return rather than keeping track of the parameter length. One disadvantage of the latter method is that it ties up a counting register, typically CX. My preferred ap-

MAKE AND TOUCH: PROGRAMMING ALLIES

Fellow programmers will attest that when the programming fit is upon them, any disruption in their hypnotic fervor requires an annoying recovery time. When you're trying to juggle so many details in your mind, any distraction can bring them tumbling down.

tion can bring them turnfling down.
Periodically, however, I force myself
to take breaks from writing to complic
link, and test a section of code step by
step. This prevents clusive bugs later on.
It's important to me to keep these breaks
as brief as possible so as not to lose the
train of thought. And any programming
tools that can accelerate this part of the
creative process are worth their weight in
sold.

The MAKE utility included with the Microsoft MASM and QuickC language compilers is one such tool. MAKE provides a hatch-file-type interpreter that automates the compiling and linking of multiple modules during program development. In a nutshell. MAKE speeds up the process by compiling source code only when it's been updated. It can do other things, but this is its main purpose.

There are occasions, however, when a source file is updated and you do not wish to recompile the program. The most obvious is when you add a comment to source code. It would be nice if you could inform MAKE not to execute the needless compilation in this situation. This is where TOUCH comes in.

MAKE reads text-based "description files" that formulate implicit "If ... then" statements. These control program update maintenance on the hasis of a file's date and time stamp. The primary use of MAKE is to automatically update

an executable file by recompiling and linking object files whenever any of the dependent source files are altered.

The description file is made up of one or more "description blocks," the format of which is dictated by a few simple syntax rules. A description block consists of the following general form:

outfile:[infile[...[#comment[|#comment] | command

[command[

The description block can be read:
"IF the outfile is out of date with respect
to any infile, or if the outfile does not exist, THEN DO command." The colon

acts as the delimiter between an outfile and the infiles. There can be only one outfile, but there can be multiple or no dependent infiles. If only the outfile is given, the command is automatically carried out. The command can be a program, batch command, or DOS command and must be indented by at least one space or tab character. There is no limit on the number of commands, but each must appear on an indented line by itself. Comments are identified by prefacing a number sign (#) character. If comments appear on a line by themselves, they must start in the first column to differentiate them from commands. A description file can have multiple description blocks, each delimited by one or more blank lines.

Although the description file can have any name, the convention of using the same name as the file it maintains without the extension simplifies matters. To run MAKE you just give it the name of the description file as an argument. For example, suppose you entered MAKE MYPROG, where MYPROG consists of the description blocks in Figure A.

If this were the first time you attempted to make MYPROG, EXE, so the three object files did not yet exist, MAKE would execute all four of the commands. It would assemble the three . ASM source files into .OBJs and link them into one EXE executable file called MYPROG .EXE. Suppose now that after completion of this first program creation, MY-PROG did not operate to your expectations, requiring a modification to the code of FILE1. ASM. (I rarely have such misfortunes, all of my efforts being successful on the first try.) After the correction you would enter MAKE MYPROG again, and this time MAKE would see that FILELASM has a date later than FILE1.OBJ, created from the last time you ran MAKE, and would reassemble FILE LOBJ. The source files of the second and third object files, however, have not been modified, and the object files would have a more recent date-time stamp than their source files, MAKE would, therefore, skip their respective assembly commands, saving precious

FILEI.OBJ : FILEI.ABN MARN FILEI ; FILE2.OBJ : FILE2.ABN MARN FILE2 ; FILE3.OBJ : FILE3.ABN MARN FILEZ ;

HIPROG.EXE : FILM1.OBJ FILM2.OBJ FILM3. LIPK FILM1 FILM2 FILM3, HIPROG ;

Figure A: A typical description block file used with the MAKE utility.

proach does, however, have the potential pitfall of overshooting the terminating earriage return. The danger arises from trusting there will always be a correctly entered parameter. Here's a scenario of how this could lead to trouble. Suppose the user entered

TOUCH /T

Perhaps he failed to remember the syntax of TOUCH or assumed the 7T meant to just update the file's time. Whatever his misconception, the job of the application is to detect the incorrect entry without any presumptions that the 7T will always be followed by a time. Let's see what would happen if a switch character parser did otherwise.

The logic to purse the command line would be to retrieve a byte and immediately check whether it's a carriage return. That's the cue that the parsing routine has loop, having no further business to do. When it encountered other characters, the parser would check if the character was the forward slash—the signal that a such character was to follow. If not, the purser was consumered. This recipe would use the pointer register, SI, to keep track of its position in the STRIP.

In the example posed above, the first thing encountered after the delimiting space would be a slash. The logical thing

development time. Since FILE1.OBJ will have been modified, the final link command will be executed as desired and a new MYPROG.EXE will be created.

Scene three of this program development saga might go something like this. MYPROG is looking pretty sharp now except for the style of one of the text message strings in FILE2.ASM. You make the change to reflect your linguistic facility. You also take the opportunity of the editing session to add appropriate comments to the improvements made to FILE1. ASM in the previous session. This time when you MAKE MYPROG. both FILE1.ASM and FILE2.ASM will be reassembled and MYPROG will once again be linked. But wait a minute. All you did to FILE1.ASM was add some comments. Reassembly of FILE1, ASM defeats the timesaving purpose of MAKE. Enter TOUCH.COM. Just before you rcMAKE MYPROG, enter

FILE1.OBJ : FILE1.ASM MYINC.INC

FILE2.OBJ : FILE2.ASM MYINC.INC

FILE3.OBJ : FILE3.ASM MYINC.INC

MASH FILE1 :

MASM FILE2 :

MASM FILE3 ;

NEWFILE.OBJ : NEWFILE.C

OCL /c NEWFILE.C

TOUCH FILEI.OBJ to postdate the file respective of FILEI.ASM, and MAKE will skip the unnecessary assembly. Only FILE2 will be reassembled and MY-PROG.EXE will quickly be linked into your final version.

If modularity of our program grew by adding an include file that was used by all three of our previous object files and a C module called NEWFILE, our MAKE description file example might reflect the changes shown in Figure B.

If this time comment was added to the MYINC. INC include file, all of the dependent object files would be updated. This could be avoided by entering TOUCH FILE: ONB before MAKEing the now utilitarian but complicated MYPROG application. TOUCH is starting to yield real payoffs, and as your code grows it can become almost a necessity if MAKE is to save rather than cost you time.—Michael J. Mefford

■ Danger arises from trusting there will always be a correctly entered parameter. The job of the application is to detect the incorrect entry without any presumptions.

to do is capitalize the next character (so only one compare is necessary) and check to see if it's a "D" or "T". So far, so good. A valid "T" switch was entered, so a call is made to a routine that converts the numbers that follow from decimal to bex. But wait a minute. The user failed to enter a number. What happens if all the subroutine does is to read the next character-in our example the terminating carriage return-and returns the interpreted nonnumeric entry as a zero to the parser? The SI place-keeping register would then point to the character immediately after the carriage return. Since DOS does not clear the remainder of the 128-byte reserved parameter area, SI would be left pointing to any

The parser will continue on its merry way, ignorant that it has passed its intend-

MYPROG_FEE : FILES ON FILES_ON FILES_ON MANTILE ON FILES ON MANTILE ON FILES ON FILES FILE

Figure B: Using TOUCH to redate FILE*. OBJ would prevent MAKE from reussembling all these files if you had merely added a comment to MYINC INC.

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ed territory. It's continuing to look for a slash and/or especially a carriage return to end its task, invariably a carriage return would be encountered, ensuring that be program will not hang. It might possibly be an OR AX immediate instruction (thins y coded as character 13), a short jump or near call of 13 bytes or a carriage return data. Whatever happens, however, the random bytes read by the passer in the process will surely be misinterpreted.

Now let's extend the scenario a step further. Suppose that just before making the mistake we're discussing, the user had correctly put a new time on a file, thus:

TOUCH filename /T 12:45

He then immediately followed with the incomplete command, TOUCH /T. TOUCH's image would be loaded in the exact same place in memory except that at 80h DOS would place

(3) /T(cr)

right over the previous lingering

(9) /T 12:45(cr) (The first number is the string length, and the (cr) stands for carriage return.) The result would be

(3) /T(cr)12:45(cr)

The real end of the string is the first carriage return, but if we return to the earlier scene of the careless parser, we now have a situation with spurious numbers in which anything crazy can happen. The reckless parser is destined for disaster.

This example is not pure soap opera but rather the result of my experience with a program I once wrote that resulted in bizarre and, for a white, mysterious behavior. The moral of this story is to not take anything for granted. Thus, closer examination discloses that TOUCH destroys the PSP, using it as the default DTA, which was not the case in my learning adventure.

ANOTHER PITFALL There's another possible trap connected with the DOS directory calls (47h, Get Current Directory), and 38h, Change Current Directory), but let me preface the problem with an outline of TOUCH's programming strategy. To help you understand TOUCH's plan of attack, I'll describe the logic from the de-

sired objective—touching a file's date and time—backwards towards the means to

that end.

DOS kindly provides a function call
57h to get or set a file's date and time. The
call is made with AL = 0 or 1, 0 representing a get request and 1 a set request. If it's a
set request, CX must equal the time and
DX the date in the DOS compressed format. If it's a get request, CX and DX will
tertum from the call with the file's respec-

tive time and date.

Before the call is made, BX has to have
a file handle. So let's back up. To obtain a
file handle. TOUCH opens the file for
reading via function 30h with AL = 0
(Open for reading). The Open a file call is
made with DX pointing to an ASCIIZ
string of the filename. A filespec parsing
routine similar to the switch character routine mentioned above separates any path

A courteous program will preserve the default directory not only of the current drive but also of any other working drive to which you may be switched

(drive and/or directory) from the filename. The purpose is to change the defaults to the requested drive and directory. Why should we parse the filespec into its individual parts? Wouldn't it be easier to just point at the complete filespee, path and filename, and let DOS take care of the rest?

and let LOS take care of the fest?

The answer is yes if the filename is tunique. But it's not that easy if the file manner contains wildcand characters. The manner contains wildcand characters that the file of the file of

placed at offset 300 of the default DTA. The default DTA is Mo of the PSP—the same place as the command line parameter sort—so the continual mine. Of course, the DTA could command line. Of course, the DTA could be presented to the default of the

That's why the filespec is parsed into its components, changing the default path to the requested and dealing with the filename on its own. There's evidence many programs use this approach by the way they mishandle it. A task-oriented program may accomplish its own goal, for example, but may prove inconsiderate by failing to restore the default path to what it was. Its telltale sign is evident when you are returned to the DOS prompt in a directory other than the one from which you started. This thoughtless behavior could be dangerous if you followed with a DEL command directed towards the default directory you assumed you were in.

A courteous program will preserve the default directory not only of the current drive but also of any other working drive to which you may be switched. Practicing what I preach, TOUCH first gets the current drive and directory and stores it. Then, if the At drive was requested, it is made the default and its current directory is retrieved and stored. Finally, the default pub of the now-working drive is changed to any requested. Onexit, everything is restored in the reverse order.

That brings us to that idiosyncrasy of getting and changing directories I mentioned. It must be dealt with if TOUCH is a control Discovery returns ISSS II filled tout with the complete path name from the competition of the complement of the complement to the complete path name from the top-indicest. The returned string does not begin with a backslash. If the complement returned is a possible of the complement possible of the complement of the complement possible of the complement of the complement without the prefacing root stales, it, will either fail or send us to a directory other than intended. The application is expected to

TOUCH BY MODEM

The programs published in PC Magazine can be downloaded by modern from the PC Magazine Interactive Reader Service. There is no charge for this service, but users are cautioned that these produced that the produced the service of th

The Eastern modern number for PC-IRS is (212) 696-0360. In the West, call (415) 598-9100. Set Journ modern and communications software to use 2400/1200/300 bps, 8 data bits, 1 stop bit, no parity. Files with a COM, EXE, or ARC extension require use of the Xmodern error-thecking protocol; files with ASM or BAS extensions can be downloaded using chief regular ASCII or Xmodern.

If you use the Xmodem protocol, you can download TOUCH .COM directly, saving typing or downloading either the BAS or the .ASM version. TOUCH.BAS, whether entered from the magazine at your keyboard or downloaded from PC-IRS, will automatically create TOUCH.COM when TOUCH is run once in BA-SIC TOUCH ASM, also listed both here and on PC-IRS, allows you to modify the program but requires you to use a macro assembler (IBM or Microsoft, Version 2 or later) and the following commands:

MASM TOUCH; LINK TOUCH;

EXE2BIN TOUCH TOUCH.COM

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TOUCH Command

Michael J. Mefford Purpose:

d 1988 No. 7 (Utilities)

Changes the DOS date and/or time designation of a file or group of files either to the current system values or to user-

Format: Remarks: TOUCH filespec [/D date] [/T time]

designated values.

Entered without any arguments, TOUCH displays a help screen showing its syntax. If given a filespec but neither of the optional switches (/D or /T), TOUCH updates the designated file to the current system date and time. Note that the standard DOS filename wildcards (*and ?) are supported, so TOUCH can operate on groups of files.

The optional /D date switch permits entry of a user-selected date in the customary DCS mm-d-ry format. It festered, the hyphen delimiters may be replaced by forward slashes (/), and the year may be entered either in full form (e.g., 1988) or in abbreviated (88) form. TOUCH checks that each of the three fields is filled with a nonzero value but does not check the validity of a date (e.g., 2/31/88). Legal DOS years are from 1990 to 2090.

The optional /T time switch permits entry of a user-specified time, in hours:minutes:seconds. If the minutes and/or seconds parameters are omitted, TOUCH will set them to 0. Hours should be entered in military (24-hour) format.



UTILITIES

slip a backslash before the string. To conform with the ASCIIZ format, the 47h retrieve directory call places a zero at the end of the path string. If it's the root, all that is returned is a zero. Programmer, beware.

To round out the discussion on TOUCH's logic, I should mention one

other detail. If no switch characters were detected by the switch parsing routine, TOUCH uses the system date and time, which are retrieved by function calls 2Ah (Get Date) and 2Ch (Get Time), respectively. If only one of the optional switches is specified, TOUCH uses the file's value

for the missing parameter. You cannot call 57h (Get/Set a File's Date and Time) and set only one, date or time. TOUCH, however, does not need to make an additional Get File's Date/Time call to fill in the missing parameter. Both the Find First and Find Next calls, which have just been used to obtain a filename for any wildcard entries, return all the file's statistics, including its current date and time stamp.

Time and Date Bit Coding

Т	ime	Date					
—— Byte 23——	Byte 22	Byte 25 Byte 24	Byte 24				
hhhhhmmm	m m m x x x x x	у у у у у у m m m m d d d	d				
h = hour m = minutes x = 2-second increm	(0-23) (0-59) ents (0-28)	y = year (0-119) m = month (1-12) d = day (1-31)					

The bit mapping of the time and date information in a file's directory entry.

DOS DATA COMPRESSION Now to the specifics of the date-time compression I promised earlier. The details of a file's statistics, including the date and time, are kept in a 32-byte record in the disk directory. To keep this entry concise, two 16-bit words are dedicated, one each to the date and time entries. To cram all the necessary information in a word, it is broken down

into separate bit fields. The time and date

have the format shown in the diagram



To explode the compressed data, a program must shift the appropriate number of bits to right-justify and must then mask off the unwanted bits by ANDing to isolate a particular number. The opposite is done in converting a decimal number into its hexadecimal compressed equivalent. It's interesting to note that the bit rationing doesn't put any constraints on the resolution of any of the entries except the seconds and the year. Neither the 2-second restriction nor the 120-year range, however, is much of a sacrifice. The scheme for the year uses a base year of 1980, interpreted as zero, up to 2099, represented by 119. That's why you see the default date come up as 1-1-1980 when you boot your machine, assuming you're not fortunate enough to have a battery clock.

Actually, with 7 bits allotted for the year field, the largest number that could be represented is 127; added to 1980, that would be 2107. The only reason that this

theoretical maximum is not used, other than the fact DOS will not live to be 127 years old (OSZ-ba arrived), is that 2099 is the upper limit that works with a simple calendar algorithm. The year 2100 marks the next epact for our Gregorian calendar, when the intercalary day correction better known as a leap year will be skipped. Febnuary 2100 will have 28 days instead of 29, an irregularity easier avoided by DOS.

TIMELESS FILES Finally, I'd like to share an interesting DOS anomaly that I discovered in the course of developing TOUCH. DOS will accept a zero or midnight time, but if this is stamped on a file, the time is not displayed by the DIR command. To demonstrate this phenomenon, you should enter the following commands directly from the DOS gromor.

TOUCH filename /T 0 DIR filename TOUCH will correctly display the new time of TOUCH. BAT as 12:00a, but DOS DIR will leave the time field blank. You might think that, keeping the late hours I do, I'd have saved a file exactly at the witching hour long ago and would have discovered this before. Actually, however, the odds of finding this oddity are slimmer than you'd think. Remember that although a file's time is displayed precise only to the minute, the disk directory entry is accurate to two seconds. That's why, unless you happen to be an explosive typist, you have to enter the above set of commands from a batch file. Don't forget to reset the time

That's it for now. I hope I've favorably touched your day and that you find TOUCH a welcome addition to your programming tool box.

Michael J. Mefford is a contributing editor of PC Magazine.



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OS/2 PROGRAMMING ON A BUDGET



Two undocumented gifts in IBM's now-released Standard Edition of OS/2 enable you to start assembly language programming in OS/2 without Microsoft's costly development kit.

I'm postponing the intended continuation of my discussion of OS/2 multitasking because—as you can probably tell from "OS/2: A New Beginning for PC Applications," in this issue—I finally got my hands on IBM's official retail version, OS/2, Release 1.0.

There's some especially welcome news for readers of this column that I had no occasion to mention in the feature story. First, IBM's OS/2 includes a LINK EXE program that creates the New Executable Format .EXE files required by OS/2. LINK.EXE itself is a dual-mode program that runs both in protected mode (called "OS/2 Mode" in the IBM manual) and in real mode ("DOS Compatibility Mode"). Second, IBM's OS/2 also includes-and this I did not expect to see at all-the DOS-CALLS.LIB import library. When you run LINK to create an OS/2 program, LINK uses DOSCALLS.LIB to add dynamic link information to the .EXE file. Neither LINK EXE nor DOSCALLS LIB is described anywhere in the IBM manual. however, so the significance of their inclusion may need some explanation

Why is the inclusion of these two files in IBM's OS2 such good news Simple: if you have IBM's OS2 Standard Edition 1.50, you have all the software you need to begin writing assembly language programs for OS2 without making either IBM or Microsoft any richer. How's that for OS2 programming on a budget?

In this column, I'll touch briefly on how it can be done. In the next issue, we'll create a small but useful utility called WAKE- UP that you can use for setting an alarm to wake you up.

HOW THE SDKs WILL HELP Of course, writing OS2 assembly language programs equipped with only MASM 5.0 and IBM's OS2 1 lo is still a little like crossing the Atlantic in a sailboat without any navigational aids. There are still a few important components you'll eventually meet to add. These missing parts will be supplied in software development kits (SDKs) sold by IBM and Microsoft.

As of this writing (early December), both IBM and Microsoft are expected to release software development kits for OS/2 "very soon now." These SDKs will be considerably less expensive than Microsoft's \$3,000 OS/2 extravasaraz.

The most important part of the SDK will be technical documentation for the OS/2 function calls. However, I'm aware of several OS/2 programming books in the

■ Writing OS/2 programs with only MASM 5.0 and IBM's OS/2 1.0 is a little like crossing the Atlantic in a sailboat without any navigational aids.

works, and I've been discussing OS/2 function calls in this column, so you can at least get a start without the complete, official documentation.

Another difficulty that stands in the way of programming for OS2 on a budget is the lack of a debugger. Neither DEBUG nor SYMDEB will be ported to OS2. Instead, Microsoft has adapted its CodeView debugger to OS2. It's not clear yet, however, whether CodeView will be part of Microsoft's OS2 SDK or part of its compiler and assembler packages.

Eventually, the use of "include" files to define OS2 functions and structures will simplify the task of OS/2 assembly language programming. Without these files, you'll have to use your own EXTRN and STRUC statements. Other useful tools to be included in the SDNs are IMPLIB. EXE (to make import libraries for your own dynamic linking) and BIND. EXE (to make dual-mode programs that run under both OS/2 and DOS).

IBM will charge \$200 for the OS/2 Technical Reference and \$750 for a Programmer's Toolkit. I believe that Microsoft plans to include both the Technical Reference and programming tools in one package, but I have not yet been able to get a price for that OS/2 SDK.

The OS/2 versions of the various IBM assemblers and compilers will cost the same as their DOS versions: \$225 for the Macro Assembler, \$525 for the C compiler, \$595 for Pascal, BASIC, and FOR-TRAN compilers, and \$900 for the CO-BOL compiler. If history is any indication, IBM will floense all but the COBOL com-

■ ENVIRONMENTS

piler from Microsoft. (Microsoft will also sell these compilers in its own packages.) History also suggests that the Microsoft versions will be updated more frequently than the IBM versions.

WHAT YOU CAN DO NOW Although Microsoft's MASM 5.0 does not not protected mode, you can still run it under 0.02°s DOS Compatibility Mode. You Can thus use MASM 5.0 to assemble! ASM source ood files that contain to 10.3°c functions. You then run the 0.03°c LUNK. EXE program (either in 0.03°C functions. You then run the 0.03°C functions. You then run the 0.03°C functions of the 10.03°C functions

(If you want to program for OS/2 in a high-level language rather than in assembler, you'll need an OS/2 version of the compiler. The various libraries and startup code that come with the compiler must

contain calls to OS/2 functions instead of to DOS software interrupts.)

I had initially thought it would be possible to assemble OS/2 programs with any IBM or Microsoft assembler, but I encountered some problems with the earlier

versions.

IBM's Macro Assembler 1.0 is clearly unsuitable because it does not recognize 80286 instructions. Although 80286 instructions are not absolutely required in OS/2 programs, they certainly come in very handy. The most useful is the "PUSH immediate" instruction, such as

PUSH @

As I've mentioned in previous Environments columns, all OS/2 function parameters are pushed on the stack before the function is called. Without the PUSH immediate instruction, you must transfer a constant to a register or memory location before the PUSH instruction. HERE'S THE BUG IBM's Version 2.0 and Microsoft's Version 3.0 Macro Assemblers both support the 80286 instruction set and thus looked promising but both contain a bug that affects generation of the code for the PUSH immediate instruction.

Here's the bug: the PUSH immediate instruction has two forms. Normally, the machine code byte 68h is followed by two bytes that indicate the word value to be pushed on the stack.

However, if the immediate value lies anywhere between FR9th (-129) and 7Ph (127), then the assembler can instead generate the machine code byte. Ah followed by only one byte. The 80286 extends the sign of this byte in order to create a word before pushing the word on the stack. In some cases, Versions 2.0 and 3.0 of the Macro Assembler generate the 68h machine code instruction followed by only one byte of data.

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This leaves us with Versions 4.0 and 5.0 of the Microsoft Macro Assembler. Both worked fine in my checkout, but I very much prefer using the simplified segment definitions (the .CODE, .DATA, and .STACK keywords) that are supported only in Version 5.0. Considering that Version 5.0 is an inexpensive update to 4.0, I decided to go with Version 5.0.

PROTECTED-MODE RULES Protected mode is a fir friendler programme environment than real mode. For example, while tracking down the bug in the PUSH immediate instruction discussed above, in never crashed the system. Instead, 19 of the OS2 message, "A program attempted to reference storage outside the limits of stack segment. The program was ended," the program was ended, but the program was ended to the design of the control of the program and the registers at the time of the violation. Tracking down the problem was fairty stant glown the problem was fairty stant.

I must admit, however, that when you first start programming for OS/2, protected mode seems to be little more than an in-

ordinate number of rules. Here's the first: GS/2 programs must have separate code and data segments. The COM-style programs that are popular in DGS are simply not allowed. A program running in protected mode is protected against inadvertently writing over its code (a common problem in COM programs), and this requires that the data be in another segment.

operating system through DOS interrupt 21h or through the various BIOS interrupts. They use OS/2 function calls that provide equivalent services instead. OS/2 programs cannot access the "BIOS data area" at segment 40h, through again, OS/2 function calls provide ways to obtain this same information. OS/2 programs cannot directly access video display memory or

OS/2 programs cannot make calls to the

I/O ports without requesting permission

from the operating system. There are also some very subtle rules. The segment registers (CS, SS, DS, and ES) must contain either a valid segment address of a code or data segment within the program or of a memory block allocated by the program, or they must contain a O (zero). If you're in the habit of using ES for purposes other than for addressing memory, you'll have to force yourself to break that habit.

THE WAKEUP PROGRAM In the next Environments column, I'll present the source code and instructions for creating WAKEUP, a sample OS/2 program that you can put together using just the Microsoft Macro Assembler 5.0 and the LINK. EXE program and DOSCALLS.LIB file included with IBM's OS/2 Standard Edition 1.0. While you're waiting, you can initial OS/2 on your system.



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IMPROVING OUTPUT FORMATTING IN MASM



Although assembly language routines lack some of the elegance and power of C conversion and formatting functions, here's a good and instructive MASM approach.

In the last two columns, I have introduced the standard C library functions for input conversion and output formatting: soanf and printf. Both of these functions offer enough Reixibility and power to turn a MASM programmer green

with envy. They can handle single or double integers, floating-point numbers, pointers, characters, and strings, and they can be controlled by strings that are built dynamically by the application program at runtime. Since I don't want the assembly language programmers in the audience to feel unloved and unappreciated, I'm going to devote this column to an improved outputformatting routine—called LCVT—for MASM applications. The LCVT proce-

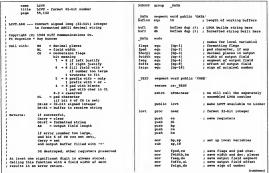


Figure 1: The source listing for LCVT.ASM, a routine that converts signed long (32-bit) integers into formatted ASCII decimal strings.

2000

■ POWER PROGRAMMING

	or	b1.b1	: is output width zero?	1	mov	es, feeg	; set ES:DI = eddress end
	inx	lcvt#1	; no, proceed	1	BOY	di, foffe	; CX = length of user's
	370	lovt15	; error if width - zero		mov	el,fwidth	output buffer
					xor	ch, ch	
cvt01:		bb,(buflen+2)	; too many decimel places?				
	5be	levt#2	; no, proceed ; error if buffer too smell		jexz	lovt15	; return error if output ; field width = zero
	jep	10Vt14	; error if buffer too smell				; field width - zero
levt#2:	or	dx, dx	; test sign of number	1	cno	cx, ex	; is string too big for
	3ne	levt#3	: jump if number positive	1	-		
	neg	dx	; negetive, take abe. value	1	jee	levt11	; no, jump
	neg	dx. 0	of number so we can control	1			; OR to truncete string?
	9.00	ux, e) side bracement	1	1001	byte ptr flee	, or co clausece scrings
levt#3:	mov	cx,10	; use decimal bese	1	12	lcvt14	1 no, error has occurred
	MOV	si.pgmour	; set DS:SI = locel buffer	1			
	mov	de, #1			mov	ex,cx	; truncete formatted length
	MOV	mov si,offset DGROUP:buf1					; to output field length
	cell	LTOA	; convert DX:AX to ASCII	leville	nueh	ax	: save formatted length
			: returns DG:SI -> string.		,		
			: AX = length	1	NOA	el,''	; default ped cher = blenk
			; now format the string	1			
			a makes an end of state:	1	test	byte ptr flee	; test special pedding fleg
	edd	si,ax	; point to end of string ; returned by LTCA	1	iz	lcvt12	: fump if use ASCII blenk
	BOY	CX.ex	: let CX = string length		,-		
					DOA	el,fped	; also use special ober
	push	de	; point to end of buffer	1			
	bob	0.0	; for formatted string pp:buf2+buflen-1	levt12:	rep st	osb	; flood output field with ; padding character
	MOA	di, errset DGRO	3F10U12+0U1180-1				; penusny enerector
	atd		; set direction fleq		mov	di,foffs	; restore output buffer eddre
			r for backwerds move		pop	CX	; leogth of formatted string
	xor	bx,bx	; init. places counter				
			: transfer one cher.		test	byte ptr flee	; left or right justify?
lovt#4;	inc	bw	; transfer one cher. ; count cherecters		iz	lcvt13	; jump if left justify
	CHD	bl.fdecpl	: need decimal point?		,.	101013	, lead it terr learning
	ine	lcvt#5	i no. juro		MOV	el,fwidtb	; right justify, length of
	BOY	el,'.'	; yes, store it		XOL	eh, eh	; user's output buffer
	stosb				eub	ex,cx di.ex	; - formatted string length ; - offset into output field
levt#5:	1	lcvt#4	, until ell chare, transferred		900	dl,ex	; - offset into output field
TGAFB31	1000	104644	, until ell chais. Clemateries	levtl3:	rep mo	vab	: trensfer formatted string
	cep	bl.fdecpl	: decimal teken cere of?	2010101			to user's buffer
	50	levtes	; yes, jump				
		levt#7	: well, partielly		clc imp	lovt16	; success signel: clear Cerry ; go cleen up end exit
	je	1cvt#7	; well, partielly		380	TOACIE) do creeu nb eug exit
lovt#6:			; no, need decimal point	lcvt14:			; error encountered, fill
	BOY	01.'0'	: store zeros up to				output field with 'e' chers
	stosb		; decimal point				
	inc	bx			MOV	es,feeg	; ES:DI -> output field
	ine	bl,fdecpl levt#6		1	mov mov	di.foffe cl.fwidth	: CX = output field length
	3100	el. '.'	: store decimal point		NOV TOX	cb,cb	, cm - outbot trend tenden
	stosb			1	BOY	el.'**	; charecter = esterisk
					rep at	osb	; flood the output buffer
lovt#7:	stosb	el, '0'	; force leeding zero	1			
	acosp			levt15:	etc		; error signel: set Cerry
Lovtes			: wee number negetive?	levt16:	nov	ds,fseg	: return DG:SI = eddress
	test	word ptr feign.	-1		BOY	el.foffe	of output field
	jne	lovt#9	+ no. Sum		nov	el,fwidtb	: AX = output field width
	104	01,'-'	; yee, store '-' sign		nov	oh, 0	(protect cerry fleg)
	ino	levtle		T.	NOV	ep.bp	: discerd local variables
	Jmp	TGAETA			MOA	ep,op	; discard todel Astimples
Lovt#9:			; positive number, is		pop	bx	; restore registers
			; '+' sign needed?		pop	CX	
	test	byte ptr flegs,	20h		pop	bp di	
	jz mov	el, '+'	; no, jump ; yes, store '+' sign	1	pop	di.	
	stosb	•4.,	, yes, score sign	1	lands.	••	
				1	ret		r beck to celler
levtle:	cld		; string now formatted				
				levt	endp		
	POV	ai,di	; copy eddress	1			
	inc	#1	; point to formatted string ; end celculate its length	TEXT	ende		
	mov	av.offsat posses					
	mov sub	ex, offset DGROS	JP:buf2+buflen j now AX = formatted length		end		

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■ POWER PROGRAMMING

dure (see Figure 1), while not even real competition for C's printf, offers a glimpse of the work that would be required to build the equivalent functionality of printf into an assembly language pro-

gram. LCVT and its interactive demonstration program, TRYLCVT (shown below in Figure 2), build upon the LTOA (long integer to ASCII) and ATOL (ASCII to long integer to ASCII) and ATOL (ASCII to long integer to were shown routines published in earlier Power Programming columns integer conversion routines published in cartier Power Programming columns (February 16 and 2), 1983. You will need to receive the conversion of the

demonstration program also requires the

conversion routine HTOL (hex ASCII to long integer), which may be found in Figure 3.

WHAT LCVT DOES LCVT converts double precision (32-bit) signed binary integers into a formatted ASCII string, using decimal base (radix = 10). It is capable, among other things. of right or left justification, padding an output field with a special character, and insertion of a decimal point at a specified location in a number.

Unlike the simple ITOA and LTOA conversion routines I presented a few issues ago, LCVT requires quite a few different parameters. It is called with the registers set up as shown in the diagram "LCVT Calling Interface."

The decimal places parameter controls

the point at which a decimal point will be inserted into the formatted string. Leading zeros are added to the output string if necessary to accommodate the number of decimal places requested. If this is zero, no

decimal point will appear at all

ter.

grander with a water

The field width parameter specifies the number of character positions available in the caller's buffer to accept the output string. The output field is first initialized, and then the formatted numeric string is left- or right-justified in the field according to the conversion flass.

The conversion flags parameter controls justification, sign insertion, truncation, and padding of the output field. The bits of register CH are interpreted as shown in the table "Conversion Flags Parame-

fwidth, al ; sime save width ; get decimal places TRILCYT --- LCVT demonstration title dx,offaet prompt3 page 55,132 BOY cx,p3_len getnum fdecpl,al ; and save it TRILCYT.ASM --- an interactive demonstration of the LCVT forwatting routine BOT dx,offaet prompt4 : oet conversion flags cx,p4 lan call ai,offact inbuff ; ignore decimal value, HOY call ; convert input as hex, ; save conversion flags Ray Doccan, December 1987 flaga.al BOY test j= al,10h main3 ; apecial pad character; ; no, jump dx,offaet prompt5 ; get pad character cx,p5_len DATA DERCOT ATOMO call ah,1 21h display prompt func. 1 = cbar. input tracafer to MS-DOS mov int mov cwp jaa TEXT segment word public 'Cook' fpad, al agre pad character was it a control. char? 41. assume cal_TEXT,dal_DATA main) fpad, ' yes, use a blank instead extro ASCII to loog integer display "You entered: " ; format decimal long int. dw.offeat display LOUTINGS STOL: Deal ox,d lan to the user ... extro mein proc ; load registers and call ; LCVT formatting routine. ; 32-bit number to convert da,ax ; meks our data sagment ; addressable... dx, fval+2 804 804 807 807 807 ax, fval bh, fdacpl bl, fwidth number of decimal places output field width BOY dx,offset aignor ; diaplay sign-on message ch, flags nversion flags cx, ac_len ol, fped si, offset outbuff pad character DS:SI -> output buffer dx,offset promptl mainle ; get number to convert now format the our cx,pllen getnum byte ptr inbuff,cr raturna Dist = output call field, Ax = langth, emp ; was anything entered? Carry = auccess/error CX = atring length I Yee, proceed mov oall DS:DX = atricg address display formatted atring ax, 4c00h 21h ; no, exit to MB-DOS maicl : do it acain... ; yes, save the number fval+2,dx ; display message on atdout dx,offset prompt2 : out output width call cx,p2_lan ; DS:DE - mesasge address ; make sure width nonzero " mesason length | jump, width was sero (continue

Figure 2: TRYLCVT provides an interactive demonstration of the LCVT formatting routine.



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	BOY	bx,1 ab,48b	; hendle 1 = standard output ; function 48h = write	p1_len	equ	\$-prompt1	
	int	21h	trenefer to MS-DOS	prompti		er.lf	
	ret		; return to caller	p2 len		'Eoter output width: 9-promot2	
passeq	endp						
				prompt]		er,lf 'Enter decimal places:	
getoum proc	2800	; display prompt, get input,	p3_leo	eds.	\$-prompt3		
			; and convert to binary ; call with	prompt4		or.lf	
			DS:DX = prompt address		-	'Enter flens (hee);	
			: CX * prompt length ; returne	P4_leo	+94	\$-prompt4	
			DX:AX - value entered	prompt1	0	or,1f 'Enter ped character:	
	cell	pmeg	; display the prompt	p5_len	equ	8-prompt5	
	BOY	dx,offeet inbuff	; read keyboard entry	display	•	er,1f,1f	
	BOY	ce, ## be, #	; from the user handle # w stendard input	d len	do equ	'You entered: 5-display	
	BOY		funct. lfx - read	-			
	ict	21h	; transfer to MS-DOS	fval	8	0,0	; velue to be formatted
	mov.	ei.offeet inbuff	; coovert convert user's	flege	8	:	; conversion flage ; width of output field
	call	atol	: input to bioery in DE:AX	fdecpl		:	; decimal places
				fpad		i	; pedding cher.
	ret		; return to celler	inbuff	-	88 dup (?)	keyboard imput buffer
getoum	endp			outbuff		66 dup (7)	; output formatting buffer
TEXT	anda			DATA		,	,
wat	4000			_DATA	+000		
DATA	eegment	word public 'DATA'		FTACK	ee gneni	pare etack 'STACK'	
elgoon	db	or, lf, 'LOVE Demonstre	otion Program'		٠	128 dup (7)	
eo_leo		5-eignon		PTACK	ende		
prompt1	db	er,lf,lf,lf			end	maio	
				1	****		(Figure 2 en
_							(Figure 2 en
_	0480	*TCL		1	cre	41.77	
-	came page title	55,132	one Interer		emp jbe	#1, "9" htm12	; proceed if char '8'-'9'
	came page title	erot. 55,132 BTOG - See ASCII to 1	ong iotejer		cre	41.77	
I HTOL.	title	55,132 HTGL - See ASCII to 1			emp jles or	s1, '9' hts12 s1,28h	; proceed if char '8'~'9'; fold char, to lower case.
	title ASH - co to	55,132 HTGL - See ASCII to l severt bexadecimal ASCI long (32-hit) [eteger	I atrice		emp jbe or emp je	si,'5' html2 el,28h el,'f' html3	; proceed if char '8'-'9'
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Copy	ASK - co to right (c)	55,132 BTOG - See ASCII to 1 severt beradecimal ASCI long (32-bit) leteger 1988 Siff Communicati	I atries		emp jiba er emp ja	el, '9' heel2 el, 28h el, 'f' heel3 el, 'e'	; proceed if char '8'-'9' ; fold char, to lower case. ; eait if > 'P' or 'f'
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Figure 3: Another general-purpose support procedure, HTOL ASM converts hexadecimal ASCII strings to long (32-bit) integers.



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The pad character in register CL is used only if bit 4 of the conversion flags parameter in register CH is set. Otherwise. the pad character defaults to an ASCII blank and register CL is ignored. The pad character is used to initialize the positions of the output field (i.e., addresses DS:SI through DS:SI+width-1) that are not occupied by the formatted numeric string.

Upon return from the LCVT routine, the carry flag is clear if the conversion was successful and is set if an error was encountered. The usual cause of an error is a number that is too large to fit into the output field after it has been converted into ASCII. When this happens, registers DS:SI are returned unchanged-that is, pointing to the beginning of the output field-and register AX contains the length of the output field (for symmetry with the routine LTOA).

Notice that I have arranged the registers and flags so that a zero value (except for the output field width) results in the simplest, most common numeric format; leftjustified, padded with blanks, no decimal point, and no truncation allowed. For example, the code sequence shown in Figure 4 will convert the value 10 to an ASCII string, and will then left-justify the string in an output field that is eight characters wide.

LCVT Calling Interface

Decimal places BH

BL

Conversion flags

CL

ad character DX:AX

Address of buffer to received formatted string

The parameters needed to execute the LCVT routine are passed via the registe HOW LCVT WORKS The first thing LCVT does is save all affected registers. It then creates a stack frame of local variables where it can place copies of the various formatting parameters and the sign of the number to be converted. In this particular case (Figure 4), we are not using a stack frame to make the routine reentrant, but merely for addressing convenience: the local variables are accessed through SS:BP, so we can use the DS and ES segment reg-

isters for other things with a minimum of hassle. LCVT then performs some elementary

error checking on the formatting parameters. If the width of the output field is zero, or the number of decimal places is such that the resulting number will not fit into LCVT's local working buffer, the routine exits with an error condition. If you are inclined to make the routine more idiotproof, you can add additional error checking for field widths that are negative or too large, illegal conversion flags, unprintable pad characters, etc.

Once the parameters have been validated, LCVT checks the sign of the number to be converted. It takes the absolute value of

Conversion Flags Parameter

Bit	Value	Significance
7	0	Left-justify
	1	Right-justily
6	0	Fill field with * character if formatted number is too large for field
	1	Truncate number if necessary to fit within field
5	0	Prefix number with - sign if negative, no sign if positive
	1	Always prefix number with + or - sign
4	0	Use ASCII blank as pad character
	1	Use character in register CL as pad character

The conversion flags parameter controls justification, sign insertion, truncation, and padding of the output field.

Not used

```
mov
     ax,10
                     : number to convert
cwd
                     ; make it into a double
mov
     si, seg buffer
                     ; address of output field
mov
     ds, si
     si, offset buffer
mov
mov
     bx,8
                     ; field width = 8
                     ; decimal places = 8
mov
                     ; flags = 0
     cx, 8
                     ; pad char not used
call LCVT
                     ; request formatting
ic
     error
                     ; jump if conversion error
```

Figure 4: An assembly language code sequence that converts the value 10 into an ASCII string, left-justified, in an eight-character-wide output field.

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■ POWER PROGRAMMING

the number if the sign is negative. This is done to prevent LTOA from attempting to insert a sign into the string, so that LCVT can keep complete control over the sign placement. LCVT then calls LTOA with the positive 32-bit number, which LTOA converts to an ASCII string in LCVT's working buffer.

With the primitive ASCII string produced by LTOA in hand, LCVT can proceed to apply the various formatting options requested by the calling program. It first inserts the decimal point into the string at the requested location, adding leading ways makes sure that there is at least on edge in front of the decimal point. LCVT then adds a — (minus) sign in front of the string if the original number is negative. LCVT adds a + LCVT a + LCVT

hags (register C-r) is set.

At this point, the length of the formatted string (including the decimal point
and/or sign) is known, and the string is
ready to be copied to the calling program's

buffer.
First, depending on bit 4 of the conversion flags, LCVT initializes the caller's buffer with ASCII blanks or with the specified pad character. This relieves the calling program of the need to worry about any re-

C)TRYLCVT

LCVT Demonstration Program

Enter a number: 1234

Enter output width: 10

Enter decimal places: 2 Enter flags (hex); 30

Enter pad character: #

You entered:

Enter a number: ()

Figure 5: Typical output received during a session with the TRYLCVT.EXE demonstration program.

+12.34####

sidual characters in the field from previous

output operations.

Next, LCVT checks the length of the formatted string against the caller's field width. If the string first into the field, LCVT tests bit 7 of the conversion flags (to determine whether the numeric string should be right or left-justified) and copies the formatted string to the user's buffer with the appropriate of the property of the string to the user's buffer with the appropriate of the string to the user's buffer with the appropriate of the string to the user's buffer with the appropriate of the string to the user's buffer with the appropriate of the string to the user's buffer with the appropriate of the string the s

If the formatted string does not fit into the caller's field, LCVT tests bit 6 of the conversion flags to see whether the number may be truncated. If the bit is zero,

LCVT fills the caller's field with asterisk (*) characters to indicate an overflow. If bit 6 is set, LCVT simply copies as many

characters as will fit, discarding the leastsignificant digits.

Finally, LCVT discards the local variables on the stack frame, restores the affected registers, and returns with the DS:SI and AX registers containing the address and length of the output field. The carry flag can be tested by the calling program to determine whether there was an output field overflow or some other conversion error occurred.

Source Code Files

LCVT.ASM Source code for the LCVT (long decimal integer) conversion

routine (this issue).

TRYLCVT.ASM Source code for the TRYLCVT program (this issue).

HTOL.ASM Source code for the HTOL (hex ASCII to long integer) conversion routine (this issue).

ATOLASM Source code for the ATOL (ASCII to long integer) conversion routine, Power Programming column, February 16, 1988.

LTOA.ASM Source code for the LTOA (long integer to ASCII) conversion routine, Power Programming column, February 29, 1988.

You'll need all these files to create the demonstration program TRYLCVT. Follow the instructions given in the text to create the executable file.

ltoa.obj : ltoa.asm masm /Zi ltoa;

atol.obi : atol.asm

masm /Zi atol; lcvt.obi : lcvt.asm

masm /Zi lcvt; htol.obi : htol.asm

masm /zi htol;

trylcvt.obj : trylcvt.asm masm /Zi trylcvt;

trylcvt.exe : trylcvt.obj atol.obj lcvt.obj ltoa.obj htol.obj link /CODEVIEW trylcvt+lcvt+htol+ltoa+atol;

Figure 6: A sample MAKE file that automates the creation of the TRYLCVT program. The commands in this example include the (Zi and ICODEVIEW switches so that CodeView can be used to interactively single-step through the program and observe the operation of the various submountained.

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■ POWER PROGRAMMING

THE TRYLCYT DEMO PROGRAM Since LCVT's parameters can be combined in so many different ways, I wrote a short, interactive demonstration program called TRYLCVT (see Figure 2) that you can use to try out LCVT's various capabilities. TRYLCVT asks you to enter a number and the various formatting options. calls LCVT to convert the number to a string, and then displays the result. To exit from TRYLCVT, just press Enter at the "Enter a number:" prompt. Figure 5 shows an example of the TRYLCVT demonstration program at work.

In order to use TRYLCVT, you need the files listed in the table "Source Code Files." Assemble all these source files into their respective object modules with the command sequence

MASH LCVT: MASM TRYLCVT: MASH HTOL: MASH LTOA:

MASM ATOL: Finally, link the object modules

TRYLCVT.OBJ, LCVT.OBJ, HTOL OBJ. I.TOA OBJ. and ATOL OBJ into the executable program TRYLCVT.EXE with the command

LINK TRYLCVT+LCVT+HTOL+LTOA+ATOL:

Make sure you provide LINK's parameters in the order shown, since in this instance LINK takes the name of the .EXE file from the name of the first .OBJ file you provide.

You can automate the whole process by using a MAKE file, such as that shown in Figure 6. Then, whenever you change any of the source files, you can let MAKE do the dirty work of figuring out which files need to be reassembled and relinked.

THE IN-BOX Comments and suggestions about this column from PC readers are welcome! You can contact me by the following e-mail routes:

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The compilers are presently available in two formats: Microport Unix 5.3 or MS-DOS as extended by the Phar Lap Tools. MicroWay will port them to other 80386 operating systems such as OS/2 as the need arises and as 80386 versions. become available.

The key to addressing more than 640 kbytes is the use of 32-bit integers to address arrays. NDP Fortran-386 generates 32-bit code which executes 3 to 8 times faster than the current generation of 16-bit compilers. There are three elements each of which contributes a factor of 2 to this speed increase: very efficient use of 80386 registers to store 32-bit entities, the use of inline 32-bit arithmetic instead of library calls. and a doubling in the effective utilization of the em data bus

An example of the benefit of excellent code is a 32-bit matrix multiply. In this benchmark an NDP Fortran-386 program is run against the same program compiled with a 16-bit Fortran. Both programs were run on the same 80386 system. However, the 32-bit code ran 7.5 times faster than the 16-bit code, and 58.5 times faster than the 16-bit code executing on an IBM PC NDP FORTRAN-386*\$595

MicroWay Numerics

The mW1167™ is a MicroWay designed high speed numeric coprocessor that works with the 80386. It plugs into a 121 pin "Weltek" socket that is actually a super set of the 80387. This socket is available on a number of motherboards and accelerators including the AT&T 6386, Tandy 4000, Compaq 386/20, Hewlett Packard RS/20 and MicroWay Number Smasher 386. It combines the 64-bit Weitek 1163/64 footing point multiplier/adder with a Weitek/Intel designed "glue chip". The mW1167" runs at 3.6 MegaWhetstones (compiled with NDP Fortran-386) which is a factor of 16 faster than an AT and 2 to 4 times faster than an 80387.

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Phar Lap™ created the first tools that make it possible to develop 80386 applications which run under MS-DOS vet take advantage of the full power of the 80386. These include an 80386 monitor/loader that runs the 80386 in prote linear address mode, an assembler, linker and debugger. These tools are required for the MS-DOS version of the MicroWay NDP Compilers.

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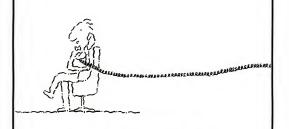
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SPREADSHEET CLINIC



A macro that remembers a cell location to which you can return instantly; using Booleanbased formulas instead of sorting to rank a column of values.

RANKING WITHOUT SORTING

I often need to rank a series of values that are arranged in a column. While this can be done with the /Data Sort command, I find it easier to create a few simple formulas—one for each number I want to rank—in an adjacent column. These formulas use Boolean logic to rank the values automatically.

For example, suppose you've entered the values 657, 116, 329, and 720 into four cells in a column, as shown in Figure 1. To rank these values, you could enter the formulas

@SUM(+B3>B2,+B4>B2,+B5>B2)+1 @SUM(+B2>B3,+B4>B3,+B5>B3)+1 @SUM(+B2>B4,+B3>B4,+B5>B4)+1 @SUM(+B2>B5,+B3>B5,+B2>B5)+1

into the cells in the adjacent column. Figure 2 shows these formulas in place. As you can see, the formulas have ranked the values in column B correctly.

Here's how the formulas work. Each of the clauses in each formula (such as +B3>-B2) and +B5>-B4) is a logical comparison. Each of these clauses will be either true, in which case it will have the value 0. Each of the clauses in each finance or the compares the value 0. Each of the clauses in each finance compares the value in the anjust concentration of the clause in each finance of the clause in the spirit concentration. For example, the first clause in the first Catuals compares B2 with B3, the second compares B2 with B4, and the third compares B2 with B4, and the third compares B2 with B4.

If the number in the adjacent cell is less than all of the other values, then each of the clauses in the formula will be true and the sum of the values of the clauses will be 3. Adding 11 o3 returns 4—the correct rank for the number if, as in this case, all of the fore values are greater. If the number of, as in this case, all of the foreign control of the clause of the clause will be rank of the values of the clause will be rank of the values of the clauses will be rank of the values of the clauses will be rank of the value if all of the clause will be rank of the value if all of the control of the control of the control of the control of the values are smaller. If the number in the adjacent cells it less than some of the other values and greater than seen, then of the values of the value of values of the values of the value of values of the values of the value of values of values of values of values of va

A B C D
2 657
3 116
4 329
5 728

Figure 1: You want to rank these numbers from I to 4.



numbers in column A.

Figure 3: If two of the numbers you want to rank are equal, this technique will give them both the same ranking.

clauses will be either 1 or 2. Adding 1 to the result of the @SUM function returns either 3 or 4—the correct rank for the number if some of the other values are greater and some are smaller.

For example, the formula in cell C2 in Figure 2 returns 2—the ranking for the value in cell B2. Notice that the value in cell B5 but greater than the value in cell B5 but greater than the values in cell B5 but greater than the values in cell B5 and B4. As a result, the first two clauses in the formula in cell C2 are false and the third is true. The sum of the two false results and the true result is 1. Adding 1 to that result returns 2—the ranking for this value.

Larry Roshfeld Potomac, Maryland

This sechnique has the advantage of allowing you to rank a series of values without sorting. This means that you don't have to define the sort range (or worry about defining the range properly). It also means that you don't have to hassle with providing a way to restore the sorted items to their original order.

However, creating the formulas that do the ranking can be tedious, sepecially if there are a large number of Items to rank. As far as we can determine, there is no way to use iCopy to create these formulas—you have to enter each one separately. At least you would have to edit each formula significantly after you used iCopy to create it. As a result, you would probably find this technique useful only in a worksheet that you could create more and then use ever.

If two or more of the values you are trying to rank are equal, then this technique



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SPREADSHEET CLINIC

a {Let LOCATION, @CELLPOINTER("address")&""}

\b {Goto}

Figure 4: A macro that allows you to store the location of a cell and return to it later.

will give all of the equal values the same rank. Then it will skip the correct number of rankings before assigning a ranking to the next value. Figure 3, for example, shows the result of entering the values 50, 100, 100, and 200 into cells B2 through B5. Notice that the ranking formulas give the values in cells B3 and B4—which are

 There are all kinds of clever ways to take advantage of the fact that

true Boolean statements have the value 1 and false statements the value 0.

equal—the rank 2, and the value in cell B2 the rank 4.

The best thing about his technique is its ingenious use of Bootean statements. There are all kinds of clever ways to take advantage of the fact that true Bootean statements have the fact that true Bootean statements have the walue! and false statements the value! This technique does statement the value! Formula make it satisfies a statements in the formula make of romalia statements in the seferation and the compact cap possible—ar real advantage when you need to rank a large number of values.

SANING ACELLICATION

SAVING A CEI

I often need to return the 1-2-3 cell pointer to a cell it previously occupied. The simple macro shown in Figure 4 greatly facilitates the task.

The macro named \a records the current location of the cell pointer. When you invoke it, 1-2-3 enters the absolute address of the current cell (the one on which the cell pointer is positioned at the time) into

the cell named LOCATION—the second cell of the macro named \b. For example, if the cell pointer is on cell G23 when you press Alt-A, 1-2-3 stores the label '\$G\$23' in LOCATION.

When you want to return to the remember deel, just invoke the macro named by. The first statement in this macro commads 1-2-3 to press the Gots key. The second cell of this macro has stored the advess of the cell by which you want to return, followed by a tilde. Thus, when 1-2-3 executes this statement, it types the address of that cell to the right of the "Entert." This remuss the cell of the right of the cell on the right of the cell on which it was positioned when you invoked the first macro.

John Gufstason Gardena, California

The technique that Mr. Gufstason describes can be used either as a simple utility macro or in the context of a larger macro. In our macros, we have often encountered the need to return the cell pointer to a cell that it occupied previously. We used the statement

/rncHERE^/rndHERE^/rncHERE^

to assign the range name HERE to the cell on which the cell pointer is positioned. We then used the statement

{Goto}HERE

to return the cell pointer to that cell. But, from now on, we'll use the method described by Mr. Gufstason.

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User-to-user

A technique that permits interactive batch file processing; a utility that lets you hear when your RAMdisk is accessed; and control for ScrollLock over scrolling screen output.

AUDIBLE VIRTUAL RAMDISK Just as physical disk drives give audible

and visual indicators when in use, the following patch to the DOS 3.x VDISK.SYS will turn on the PC's internal speaker each read/write of any RAMdisk created by the DOS VDISK.SYS utility.

Type in the VDISK, SCR script file in using a pure-ASCII word processor or EDLIN or the DOS COPY CON command. Omit the semicolons and the comments after them! Be sure to hit the Enter key after each line, especially the last one with the Q. Then make sure VDISK, SYS is in the current directory or a directory in your path, and type

DEBUG < VDISK.SCR

Note: The duration of the PC's equivalent of Concert A depends on the length of time between a call to turn on the speaker and a call to turn of the speaker. Short data transfers will make a click on the speaker and and long transfers will make a beep because the sound is on longer. The two calls are useful for debugging: placed around suspect code, they will tell whether the code is working or looping.

Bui Van Chuong New York, New York

The boops and beeps this makes also tell you when DOS is sniffing through your RAMdisk. It's often very helpful to know when DOS is loading something from your RAMdisk rather than your physical disks—and it can save you lost of anguish if DOS writes to a virtual disk when you think it's making a permanent copy.

ONE-KEY SCROLLLOCK

Having to use two keys, Ctrl and Num-Lock (or Ctrl and S), to pause scrolling screen output, and then a third key to resume scrolling, is awkward. Using the MORE filter, when applicable, is not much better. The resident NOSCROLL.COM program, created by assembling the NOSCROLL.ASM listing in Figure 2 or running the NOSCROLL.BAS program in Figure 3, will alternately pause and restart scrolling when the ScrollLock key is pressed.

	VDI	sk.:	sys						
1 5	223					CALL			Turn on spasker at entry of I/O INC
	225		90			INOP		46	and make sure that I/O is within th
	227					NOP			the VDISK sector boundaries
	23B		-			JHP		0449	Turn off if I/O not in sector bound
	209					1 3 KP		8447	Turn off speaker if all sectors xfr
	371					1 JKP		0454	Turn off speaker at exit from INOUT
	42E		Le	00		PUSH			TURN ON SPEAKER Save AX
	42F					: HOV	^^	AL.B6	Timer chip control word
	431					OUT		43.AL	Send to timer
	433					: MOV		AX. SASS	
	436			EA		OUT		42.AL	Output lesst significant byte lab
	436					: MOV		AL.AB	Output lesst significant byce iso
									Output most significant byte msb
	43A					; OUT		42,AL	Get speaker/timer value
	43C					FIN		AL, 61	Turn on timer 4 speeker
	43E					OR		AL, 03	
	440					1001		61,AL	Set timer chip
	442					FOP		AX	Restore AX
	443					;CS1			
	444		ØE	53	00	1 NOV		CX, [8852] Get total sactor count
	448					PRET			
	449					; NOV			Indicata "Sactor not found" error.
	440					;JMP		#4S7	
	44E					; NOP			
	44F					132		0457	
	451					; JMP		028E	Go back to trensfer some sectors
	454					; MOV		SP,DI	Restora old SF
1 1	456	FB				ISTI			
1 8	457	24	61			:IN-		AL. 61	TURN OFF SPEAKER Get timer value
	459	24	PC			+ AND		AL. PC	Turn off ansaker & timer

Figure 1: DEBUG VDISK-SCR to modify DOS 3: x VDISK-SYS so that it makes sounds when DOS writes to or reads from it. Type in the script using a pure-ASCII word processor or EDIM or the DOS COPY CON command. Om the semiclosus and the comments after them the sure to hit the Enter key after each line, especially the last one with the Q. Then make sure VDISK-SYS is handy and type DEBUG < VDISK-SCR.

set timer chic

E 4SB E6 61

E 450 C3

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■ USER-TO-USER

Program sets up a resident keyboard interrupt routins. If ScrollLock is pressed the routine will go into e weit loop notif the key is pressed again. Dee EXEZSIN to convert from EXE to COM format.

code seg assume escende seg, decoething

eetup sterts old_vects where old interrupt vector is seved. neerrell.

CROLL installed, by Milliam G. Hood - (C) 1987 PC Magazine',13,18,'5' key into start of keyboard interrupt routine. reed key's soen code from port

#1.68h of \$255 peripherel interfece chip. el.46h normalkey othen let BIOS process it, 8x.0 ds.ax jcheck keyboard stetus byte et 417b. byte ptr ds:[417b].4 jif Ctrl key is depressed treathey jthen let BIOS hendle Ctrl-Break, test

relee ... cs:noscroll,1 stopple coerroll fleg al,61b reed port 8 of \$255 peripheral interfece. eh. el a1,00h turn on bit 7 of port 8 to send ecknowledge to keyboard. restore old port B value.

al,sh al,20h 20h,el raignal and of interrupt to reneble interrupts.

veite cs:poscroll,1 ;if noscroll fleg is set then jos weit until another interrupt clears flog.

return from interrupt. cs:moscroll.# poleer moscroll flag if Ctrl-Break pif key is to be processed by BIOS caseld vector ; jup indirect to where old vector points.

sets up the TSR interrupt routine. ax,3589h | yuse DOS iot to get old int 89 vector. The following or setupi word ptr old vector, bx ;seve old vector returned in es:bx word ptr old vector*2,es dx, offset key_iot : put new vector in daids puse DOS lot to set new int 49 vector.

ds, offset message juse DOS int to print message. ds, offset setup-1 spoint to end of interrupt routine sterminste, leave int routine resident

start

Figure 2: NOSCROLL, ASM listing to create NOSCROLL, COM.

188 ' NOSCROLL.BAS program to create NOSCROLL.COM

119 E=14:CLS:PRINT "Checking DATA; please wait..." 120 FOR B=1 TO 11:FOR C=1 TO 16:READ AS:T=T+VAL("AH"+AS):NEXT

138 READ S:IF SOT THEN PRINT "ERROR IN LINE"; B*18+180:END 148 T=8:NEXT:RESTORE:OPEN "NOSCROLL.CON" AS \$1 LEN=1

150 FIELD \$1,1 AS D\$:FOR B=1 TO 11:FOR C=1 TO 16:READ AS 168 LSET D\$=CHR\$(VAL("4H"+A\$)):PUT \$1:IF B=11 AND C=E THEN 189 179 NEXT:READ FS:NEXT

180 CLOSE: PRINT "NOSCROLL.COM CREATED"

198 DATA E9,88,88,88,88,88,88,88,88,4E,4F,53,43,52,4F,4C,4C,989 200 DATA 20,69,6E,73,74,61,6C,6C,65,64,2C,20,62,79,20,57,1406 218 DATA 69,6C,6C,69,61,6D,28,47,2E,28,48,6F,6F,64,28,2D,1284

Figure 3: NOSCROLL BAS program to create NOSCROLL COM.

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USER-TO-USER

NOSCROLL works by servicing keybound interrupt 9. When it sees that Serol-Lock has been pressed, it sets a flag, enables interrupts, then waits until the flag is cleared after another press of the Serollock key Since the routine waits with interrupts enabled, all hardware interrupts in the serviced, including the keyboard interrupt. Normal keystroke will continue to be placed in the keystorke buffer; however, they will not be echoed until screen output is resumed.

William G. Hood Conway, Arkansas One-handed operation is indeed far better, but as with other programs like these that fool with INT 9, don't use it when Side-Kick is installed.

REAL-TIME BATCH FILE ENTRIES
I needed to find a way to send a command
from the keyboard to a batch file while it
was executing. This would let me enter a
switch or a command as needed during execution.

To accomplish this I included a line

COPY CON TEST.BAT

in my batch file. As soon as DOS reaches this line, it will pause and let me enter anything I want. Then when I type Ctrl-Z and hit Enter. DOS will resume the batch file.

In SAMPLE.BAT (Figure 4), COM-MAND /C (use CALL with DOS 3.3) executes the new TEST.BAT I just created. When TEST.BAT finishes running, DOS returns control to the main SAMPLE.BAT. Melchiore La Sala

Whitestone, New York

```
ECHO OFF
ENH RAMPLE.BAT
ECHO To edit or create a file
ECHO Uning WordStar, type:
ECHO USE Tollowed by a filename
ECHO The Enter, Cttle, them Enter
ECHO (them Enter, Cttle, them Enter
ECHO (them Enter, Cttle, Enter)
ECHO (them Enter, Cttle, Enter)
ECHO (TEST ENT.BAT)
```

Figure 4: SAMPLE.BAT, which provides instructions, then creates and executes a batch file that runs WordStur.

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CIRCLE 261 ON READER SERVICE CARD

```
ECHO OFF
IF EXIST LOG GOTO NEXT
ECHO === Logfile === > LOG
:NEXT
ECHO This will add your name to the logfile
ECHO Instructions:
         1.
             Enter your name
ЕСНО
         2.
ECHO
             Hit the Enter key
ECHO
         з.
             Hit the F6 key
ECHO
         4.
             Hit the Enter key again
CTTY NUL
COPY CON ADD
COPY LOG+ADD /B
ECHO | MORE | TIME | FIND "Current" >> LOG
CTTY CON
MORE < LOG
```

Figure 5: LOGIT.BAT batch file to add names, optional comments, and the current time to a realtime log file that keeps track of system use. This is handy for giving instructions to new users and then executing the commands they type.

they type.
You can adapt this technique to create a real-time log that will beep track of who's using your system. Just use they for system with the properties, and they will be the properties, and they will be the properties, and they will be added to the log. You may also add comments below your name, on separate lines—just be sure to his Enter, then Fo, then Enter when you're done.

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POWER USER



Creating dot leaders in WordPerfect; formatting foreign postal codes in dBASE; turning off extra line feeds in Word; creating batch files with Escape sequences from BASIC.

U.S./CANADIAN POSTAL CODES

To overcome the inconsistency in the lengths and natures of U.S. ZIP and Canadian postal codes in dBASE III PLUS, I use

a character field, 6 bytes wide.
While the U.S. ZIP is PICTured
"199999" the Canadian equivalent is
"A9A 9AP". To format the output correctly, the immediate IIFI, ISALPHA(),
and TRANSFORM() functions the
used. For example, suppose you have a
mixture of U.S. and Canadian postale or
instruct of U.S. and Canadian postale intertory through the control of the control of the control
through an LBL file, you should use the
expression

In other words, if the zip starts with an alpha, and so is Canadian, insert a space between the two three-character groups; otherwise issue the U.S. ZIP as is. The single drawback is that in an LBL form, the expression is so long that you may be forced to place the postal code on a separate line.

Peter Goudswaard Sardis, British Columbia Canada

For entering data in a GET statement, I use PICT "1919" for six-character fields. Although the PICTure won't stop all spurious output, it does prevent a user from carelessly entering a state into this field. U.S. users, who often have trouble with the sequence of alphas and numbers in Canadian codes, are thus forced to enter the correct order.

Note that this trick doesn't work if you have a ruly international database, since different folks use different strokes. I work around this by using a long city field and, if there is a foreign postal code, putting it often the city. It's not a perfect solution, but it has the added advantage that when you subsequently sort on the ZIP code, all the foreign addresses float to the top where you can see them and, if necessary, work with them as exentions.

If you are still using dBASE III, the never functions used by Mr. Goudswaard are not available, so use a seven-character field and PICT "19!19!9". This way, you can output the field naturally without any special formatting functions.

-Brad Stark

MORE ON WP LEADERS

The item "Take Me to Your Leader" in the Power User column of September 29, 1987, although clever, seems to be a case

When you subsequently sort on the ZIP code, all the foreign addresses float to the top where you can see them and work with them as exceptions. of overkill. WordPerfect 4.2 has the builtin capability to provide dot leaders if you know how to use it.

You do have to set the tabs in a particular way. Go into the TAB set screen by pressing Shift-R8, followed by 1. Clear all the tabs and set a single "R" tab at the right margin. Give it dot leaders by entering a "." on top of the "R". Now when you want flush-right text with dot leaders, sush tit the Tab key.

You can automate the process of setting up the tabs by creating a macro like that shown in Figure 1. You can easily create another macro to restore the tabs to your preferred default.

William J. Latzko North Bergen, New Jersey

This is another clever solution, but it doesn't quite address the problem of getting flush-right text with dole leaders. If you change the mangins, your sear that the longtiful problem is the state of the long-right mangins is souther, the Table Miller of the long-right mangin is souther, the Table topy us see, not with the Table topy us see, not with the right mangin. Since now readers have shown enough interest so the state of the longer than the shown enough interest to make the mangin through the companion of my com-

Follow the numbered steps below. You're not creating a macro here, because you only need to do this once.

(1) Enter any word in a new blank doc-

(2) Mark that word as a block.
(3) Hit Alt-F5, the Mark Text key.
(4) Select option 2, "List," and indi-

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POWER USER

<ctrl-rig> <shift-F8>1

<P7>

<ctrl-F10>

Begin macro definition Name it LEADERS Line Format -- Taba Go to the far left of the line

Delete all tabs Set a tab at 74 (or at your right margin) Make it a right-justified tab with leaders Exit the tab-setting screen

Ind macro definition

Figure 1: An approach to leadering with periods in WordPerfect.

cate that it's for list 1. (5) Now hit Alt-F5, 6 for "Other Op-

tions," and 3 for "Define List." (6) Select list #1 and option 5, "Flush right with leaders."

(7) Hit Alt-F5. 6 for "Other Options." and 8 for "Generate Lists," Answer "Y" to the question.

(8) Once the list has been generated, press Alt-F3 to reveal the codes. You'll see a pair of codes [A] and [a], with some

blanks and a number between them. (9) Carefully delete the blanks and the number so the [A] and [a] are adjacent.

(10) Position the cursor just before the [A] and press Alt-F4. (11) Move the cursor to just after the [a] and press the Spacebar to end the "Reveal Codes" session

(12) Press F10 to save the block to a file-call it "RIGHT" To use this file, just retrieve it into your

text. Whatever you type between the [A] and [a] codes will be flush with the current right margin, and it will stay flush-right even when you change margins. -Neil J. Rubenking

EXTRA LINE FEEDS IN WORD Radio Shack's DWII daisy wheel printer adds an extra line feed after every carriage return. The sequence Esc-Ctrl-U turns this off. For most purposes you can bypass the line feed problem by writing a BASIC program that sends an Esc 'U to the printer. then running the program automatically from the batch file that calls up your word processor.

This technique doesn't work with Microsoft Word, however, because Word resets the printer. But you can still eliminate the extra line feed by modifying the DWII.PRD file.

convert the DWII.PRD to a text file with a different extension. Then find the printer control section, which is identified by {P, Byte 18 should read

byte:18 mod:7 magic:8 value:8 *^;^\-

Change this to byte:18 mod:2 magic:8 value:8 *^[^*

Now save the file as unformatted and use MAKEPRD to convert it back to the .PRD format. Be sure to use a different name so you won't overwrite the original file. Finally, choose this as your new .PRD

file from the Printer Options menu. N. Vijavan Sacramento, California

PC Labs didn't have the Tandy printer handy to test this, but the solution ought to work. Byte 18 in the printer control sequence description sets line spacing. With mod=7, Word sends a line feed. With mod=2. Word suppresses newline after a carriage return. This is just what you want, since the printer is already adding a line feed.

Not so incidentally, many printers include a DIP switch that lets you select between adding a line feed after each carriage return or not. Setting the switch is usually the preferred solution to this problem, unless you need the line feed added for some specific program. -M. David Stone

BATCH FILES FOR PRINTERS

The BASIC program MAKSOURC.BAS. shown in Figure 2, creates a batch file, SOURCE.BAT, that will cause any pure-ASCII text file to print in tiny type on an Epson printer. By using BASIC to create SOURCE.BAT, you can embed Escape The first step is to use MAKEPRD to codes in the batch file.

240 TUTW.GRCS - LPF-0. GETS-TINYS-L. MARCINS-R. MARCINS-REF. PERFS
250 DUTK 10-1, 1, noomer. Land
250 PRINT 51, "secho off"
250 PRINT 51, "secho off"
250 PRINT 51, "secho off"
250 PRINT 51, "secho offs had been file will print in tiny type."
350 PRINT 51, "passe"

338 PRINT 41 **CMM5(255)
338 PRINT 41 **CMM5(255)
459 PRINT 41 **CMM-748CD*** >prn*
459 PRINT 81, "if not exiat 31 goto ERROR*
459 PRINT 81, "echo Printing 31..."
418 PRINT 81, "echo Printing 31..."
418 PRINT 81, "echo boarce file: \$1 ppn*
418 PRINT 81, "echo **CMM5(255)+CM5(255)+CM5(255)+CM5(255)+CMM5(255)+CMM5(255)+CMM5(255)+CMM5(255)+CMM5(25

*** TANN ***, "GOND "CHMP4(205)** >PIN"
486 PRINT 61, "dopy all pris >mull"
580 PRINT 61, "dol null"
580 PRINT 61, "dot CONTINUE
820 PRINT 61, "SURECON"
820 PRINT 61, "SURECON"

#33 PRINT #1, "echo "+CHR\$(255) #48 PRINT #1, "echo "+CHR\$(7)+"File Not Found: Please re-try." #50 PRINT #1, "coho"+CHR\$(255)

878 PRINT 81, "echo Printer will now be be reset to power-on default values."
888 PRINT 81, "echo Pomition paper and"
898 PRINT 81, "pouse"
898 PRINT 81, "pouse"
898 PRINT 81, "echo "ACMR\$(255)
898 PRINT 81, "echo "ACMR\$(255)

Figure 2: A BASIC program for creating BAT files that can send Escape sequences.

Enter the program as shown, save it, and then run it to create SOURCE BAT.

To use the batch file, enter SOURCE filename, ext.

You can modify the BASIC program to output the specific Escape codes for your printer by changing lines 150 through 230.

Thomas J. Pinkl

Ambler, Pennsylvania

This tip is most notable for its use of BASIC to create a batch file complete with Escape codes. That technique has a potentially wide range of applications for sending printer control codes.—M. David Stone

YPRIVE

The WordPerfect macro shown here immediately cancels all active print jobs retrums to the current screen. Before defining it, put the printer off-line so it won't be printing while you're in the process of defining the macro. Enter some text and hit shift-F7, then press I for "print full text." That will put something in the printing souce. Now define the macro. cancel all print jobs
Y Y to confirm
OCCR> G to continue
CCtrl-P18> End macro definition

Michael L. Mout San Diego, California

This macro won't stop your printer from printing out whatever is in its buffer already. It just cancels all the queued print jobs. But if the printer goes haywire, it's nice to be able to keep any more text from being printed.—Neil J. Rubenking

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LANGUAGES



A clever method of sending command strings to ANSI SYS through Turbo Pascal while retaining Turbo's screen commands; testing printer preparedness with OuickBASIC.

OUICKBASIC

AVOIDING PRINTER ERRORS

A frequent source of irritation is to begin printing a report or document, only to discover that the printer is not ready. One solution is to test the printer before attempting to send anything to it. This can easily be accomplished by using the QuickBA-SIC INT86 routine to access the BIOS service that reports the printer status.

Interrupt &H17 can be called specifying which printer to test, and the status will then be returned as a bit-coded integer word. Only three of the bits are important, and they can be extracted with AND and XOR, as shown in the example program (Figure 1).

Interrupt &H17 uses the number 2 in the AH register to indicate the printer test service, and a number between 0 and 2 in DX tells which printer (1-3) is to be tested. The printer status is then returned in AX and will tell if the printer is turned off, not selected, or out of paper.

Luther McIntyre Pensacola, Florida

This will tell if the printer is available only at the time when it is called; it does not prevent errors that occur during printing. Nonetheless, it catches most obvious errors and could always be called immediately before printing each line. Of course, On Error will also prevent printer errors from causing a program to crash, but many people don't like to use On Error because it makes a program larger and slower -Fthan Winer

Input "Printer Number: ", X% Call Printer.Check(X%)

Select Case X% Case P

Print "Printer is ready"

Case Else Print "Printer is not ready"

End Select

Sub Printer.Check(Num%) Static

If Num% < 1 Or Num% > 3 Then 'invalid printer

Nuns = 1

Exit Sub

Redim InArray%(7), OutArray%(7) 'used by INT86

InArraya(8) = 4H288 InArray8(3) = Num8 - 1 'adjust 1-3 to 8-2

Call Int86(4H17, Varptr(InArray%(8)), VarPtr(OutArray%(8))) Num8 = (OutArray8(8) And 6H3888) XOr 6H1888

End Sub

Figure 1: A QuickBASIC program that reports if the printer is ready.

TURBO PASCAL

BRINGING ANSI TO TURBO PASCAL

You can't normally issue command strings to ANSI.SYS from Turbo Pascal. That's because Turbo has its own output routines

that don't go through DOS Standard Output (StdOut). We've noted before that you can use the P and G compiler directives (e.g., {\$P512,\$G512}) to force your program's output to use StdOut, but you give up a lot. You lose Window, GotoXY,

PROGRAM Ansi demo; VAR

Ansi : text; BEGIN clrscri

Assign(Ansi, 'CON');

Figure 2: Use ANSI codes without losing Turbo screen commands.

LANGUAGES

ReWrite (Ansi); Window(18,5,78,28); TextColor(black);

TextBeckground(white); clrscr;

Write('THIS text is going to the normal TURBO console');

Write(' output. If a line hits the end of the current '); WriteLn('window, it will wrap around autometicelly.');

WriteLn: Write(Anei, 'BUT this text is going to the CON device vis ');

Write(Arsi,'e file celled "Ansi", end it has no respect '); Write(Ansi, 'et ell for TURBO''s windows, '): WriteLn: WriteLn:

Write(Ansi, \$27, '[#; 47; 34; 1mAn ANSI command string '); Write(Ansi, 'caused this color change');

WriteLn; WriteLn; Write(Ansi, 'Solution: When writing to the CON device');

WriteLn:

Write (Ansi,

WriteLn:

WriteLn(Ansi, \$27, '(8:48:37m'):

PND

WhereX WhereY CirFOL and almost all the screen-oriented commands.

The program in Figure 2 demonstrates a compromise. If you assign a text file variable to the CON device, it's hooked to StdOut, Anything you write to that "file" will get to ANSI SYS. The output will not recognize Turbo's windows or colors, but you can get around that by setting the colors using ANSI and by placing the cursor before each Write statement. -Neil J. Rubenking

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PC TUTOR



Now that OS/2 has been released, there still are more questions than answers. A review of where we've come from and where we're headed can provide a needed perspective.

Yes, OS/2 is out. No, it hasn't answered the questions or cleared up the confusions with which readers keep filling my mail hay Real PC users out there want to know whether they should take advantage of IBM's upgrade offer and trade their copies of DOS for OS/2. Will the thousands of dollars' worth of applications they now own be usable under OS/2? Will OS/2 run on their hardware configurations? Does OS/2 offer any advantage for the average user?

There's been no lack of articles and editorials written about OS/2, but between speculation and misinformation, little space has been devoted to an unbiased evaluation of this latest experiment in operating systems. Almost overnight, like something out of the movie Invasion of the Body Snatchers, otherwise sensible people have suddenly begun quoting the party line on OS/2. In chorus, they chant that the DOS that has served us so well and fathered the development of some of the best and most advanced software is suddenly no good. They point scornfully at DOS and claim that it has failed to adapt to the changing needs of program developers and users, and has thus become obsolete-a dinosaur.

But surely that scornful finger should be aimed at Microsoft, the author and programmer of DOS, and at IBM, which has specified the capability of each version of PC-DOS and has sired such gems as Top-View. Well, who do you suppose has written and specified OS/2? Care to guess what the future holds for it?

Let me bypass both the PR line and the

technical jargon that usually surrounds any discussion of OS/2 and take a look at the operating system from a user's and a programmer's point of view. I'm not concerned here with the details of multiple threads or protected mode, but rather with the history of interactive computing and the choices and trade-offs that have led us to the current quandary.

IN THE BEGINNING Back when the term computer was synonymous with mainframe, interactive computing meant having a very smart central processing unit connected to a number of very dumb terminals. The simplest of these terminals was the mechanical teletype (TTY) machine. The TTY was slow, noisy, and severely limited in its output ability, but bright programmers were still able to work near-miracles with it. By overprinting different combinations of characters, for example, a number of engineering programs

 Between speculation and misinformation, little space has been devoted to an unbiased evaluation of this latest experiment in operating systems.

managed to achieve a varying gray scale and could even produce primitive but effective graphics.

The first implementations of the cathode-ray tube (CRT) terminal were little more than plass TTYs. Their primary advantage was that, since they were no longer mechanically operated, greater output speeds could be achieved. In their day, these terminals were the last word in high tech, and it still gives me a thrill when I think about the day two of our "bit-bangers" were removed to make room for shiny new Hazeltine CRTs.

Nostalgia aside, the most significant aspect of these early terminals was their interface with the computer. In the simplest case, the terminals were directly connected-or hard-wired-to the mainframe, Each character, and hence, each of the bits that made up the character, was sent to and from the TTY on a single pair of wires. The bits were sent in series, one at a time-hence the term serial interface.

TREE OF KNOWLEDGE The principal disadvantage of the serial interface was the inability to specify anything about the output except the next character to be written. This hurdle was partly overcome by the next step on the evolutionary ladder: the intelligent terminal, which was essentially a hardware-based interpreter. By common agreement between the terminal and the mainframe, certain character sequences passed along the serial interface were to be interpreted as instructions for the terminal and not as characters to be displayed. These instructions were known

Microsoft purchased the operating system that would become PC-DOS and modified it to meet IBM's requirements.

as escape sequences. They made it possible to position the cursor at a certain location and to change the attributes (color, blink, bold, etc.) of the next character to be printed. Armed with these capabilities, programmers were finally able to create advanced applications, such as full-screen editors.

Using escape sequences provides obvius benefits, but it exacts a performance penalty. The speed of the serial interface is limited to a certain number of characters per second. Since escape sequences are simply characters, transmitting them means that fewer characters destined for the display can be sent in a given period of time. The result is a slower apparent display speed.

TOWER OF BABEL As intelligent terminal manufacturers prospered, they introduced a dizzvine variety of improved hardware, much of which used different instruction sets. To take advantage of each new terminal that came onto the market, a mainframe program would have to be rewritten, revised, and redistributed. Alas, this was just too expensive and time-consuming a process to be considered. The alternative was to write programs that embodied a common subset of escape sequences, thus allowing them to function on the greatest number of terminals. Such 'generic' programs could not, hawever, take advantage of the advanced features of any of the new terminals. To solve this problem and impose sense on the Babel of incompatible escape sequences, the concent of the device driver was born.

There's a useful analogy that will clarify the role of a device driver. If I were to plan a trip around the world and wanted to

be able to communicate with the natives in each country, I would have three choices. I could insist that all feedings countries use English. This places the burden of compatibility on the other got and limits his flexibility (abin to "IBM compatibility"). Or I cound become flewent that need so me. Or I cound become flewent that need the me. Or I cound become flewent that need to me. Or I cound become flewent that need to me. Or I cound become flewent that need to me. Or I cound become flewent that the countries of the work of the countries of the work of the countries of the work of the work of the device drives.

A device driver is simply a ransaling device. The driver is equipped with the specific knowledge needed to operate the nardware and with the ability to translate generic requests into specific actions. The program, specific actions. The program, specific actions are program, specific program to the request to the hardware may be For example, although two terminals might use completely different excupe security as the section, the calling program to clear the severe, the calling program to clear the severe, the calling program command to each of the device driver, and they in narn would issue the device-specific terminal instructions.

But just as taking my multilingual friend around the world would reduce my effort significantly while increasing the cost of the trip, using device drivers to simplify programming also has a price: decreased performance. A certain amount of overhead is incurred with each request made through the driver.

THE PROMISED LAND Personal computers had been around for some time before IBM reinvented them, but he maintrease world was still mainframe-oriented. Micro-computers based primarily the domain of hackers and hole-byists. This difference in audience oriented to the still a maintrease of the still a maintr

Microsoft purchased the operating system that would become PC-DOS and modified it to meet IBM's requirements. Althaugh Microsoft eventually provided a method of including custom device drivers, DOS still operates as if the output de-

vice were a dumb TTY driven by serial line. Microsoft then encouraged programmers to access the PC hardware using the DOS interface to ensure portability of programs to other microcomputers running MS-DOS. Microsoft's goal was clear: to continue the tradition of device independence. But given the miserable TTY interface, no one littend.

EVERY MANN A KING Microsoft and BIM had made a critical misake when conceptualiting the PC environment. By considering it just a small version of a mainframe, they had missed the obvious emphasis in the term personal computer. The DOS 101 interface shauld have been a rich, powerful interface designed to take advantage of the single-teats, single-task-

What we got from IBM and Microsoft was more versions of DOS with no real improvements.

ing, dedicated computer. Instead, it was miserly in capabilities and slow in operation, which forced programmers to turn to the BIOS (Basic Input/Output System) instead.

The BIOS is an interface between the hardware and the operating system—a kind of device driver for DOS. Rather than providing the BIOS code on a disk-ette-which would have allowed programmers to make changes and additions—IBM encoded it in read-only memory (ROM), thus making it a part of the hardware design of the machine itself-design of the machine itself-design of the state of the design of the state of the design of the state of the design of the machine itself-design of the state of the design of the

Programmers were urged to write to the BIOS interface to insulate the application program from differences in the underlying hardware. Program developers, however, challenging IBM's brave new world, reasoned that if bypassing DOS was good, bypassing BIOS would be better. With direct access to memory, video, and I/O, applications could be written that would be fast and dazzling. And thus was born the well-named 'ill-behaved' appli-

What the flood of applications demonstrated was an urgent desire for power, speed, and convenience on PCs. What we got from IBM and Microsoft was more versions of DOS with only minor changes and no real improvements. What went wrong?

PARADISE LOST Had IBM and Microsoft asked me about designing DOS and the PC. here's what I would have done differently. First, I'd have filled the entire IMB address space of the 8088 with RAM. except for one small ROM: a power-on self-test (POST) and bootstrap loader module. During the POST, a range of I/O addresses assigned to devices would be queried. Any expansion cards in the system would respond to the query, initialize, and be acknowledged. They would also be required, when asked, to return specific information indicating their device type, configuration, and purpose. A table of responding device IDs would be built in memory.

One of these devices, identified by system board DIP switches, would be designated as the boat device. Later versions could use CMOS memory. The responding device would then attempt to load the boot partition off whatever device it was controlling. This could be a floppy disk, hard disk, or even ROM. The boar record would then load and execute the operating system kernel, device drivers, and command shell.

Bulli-in diagnostic routines would kit and divines installed and their assigned I/O numbers. A display card, in response to a query by the diagnostics, might return be a string "IBM Enhanced Graphics Adapte the string "IBM Enhanced Graphics Adapte of the seven. Installing a new device or exposition card would be at seary as technosing an unused I/O port and phaging it im—no scene, no fust. Install two cards with the same address, and the POST simply in with the same caltress, and the POST simply in with the same caltress, one of the POST simply in with the same caltress, and the POST simply in with the same caltress, and the POST simply in with the same caltress, and the POST simply in with the same caltress, when the post of th

Since the entire operating system would

consist of device drivers and disk flies, and daing live unde be trivial. DEBUG patches to fix IBM's most institions bugs would be published on a regular basis. Adding support for a new disk or display adapter would simply involve changing the device driver. And because all device 110 would be generalized, making the move from this mythical DOS to a protected-mode version wouldn't require any more effort than changing device drivers.

OS2: PARADISE FOUND? If the description of my ideal DOS sounds more than a little like the IBM Micro Channel architecture and OS/2, it's no coincidence; the ideas are sound and the solutions are workable. But the most interest-

■ Plan on parting with more money to buy new, OS/2-compatible versions of the same software

you've already paid for.

ing aspect of OS2, from a programmer's point of view, is the overwhelming sense of delig via. Ust as in mainframe days, when programmers were forced to write to the system interface, edvice independence is nearly a reality again. My gripe is simply with the implementation, Ruther than getting an improved DOS (forget the hardware for now), we've gotten a new, com-

pletely incompatible operating system. The bottom line: if you own a PC or XT. better figure on spending money. Your purchasing plan should include a new 80286- or 80386-based mochine or accelerator board. You'll need at least 4MB of RAM if you intend to do anything useful. With a memory limit of 16MB in protected mode, how many software publishers do you think will let their programmers waste time conserving memory?

Plan on parting with more money to acquire new, OS/2-compatible versions of the same software you've already paid for. And as you write your check, bear in mind that while OS/2 is supposed to make the programmer's task easier (by providing more support in the OS), the new versions of your old DOS software will cost a lot more. No one has floured this out well

more. No one has igsured his out yet. OS2 has been designed along the lines that DOS should have been. It's a moditure discover oriented operating system. But that simply means that it loads the many many many that it loads the many many many that it loads the many many many that it loads the start professional that the why it's big. So light, infart, that the why it's big. So light, infart, that they why it's big. So light, infart, that they will many sixtem files necessary to book very! If on a \$10K floopy. If you want to try running OS2, better have a 720K, I.2MB, or I.4MB drive K.

1.44MB arwe X...

Because everything that describes or interacts with the hardware in the compater or must be on the boot disk, OS2 is really the single largest mistehenwed program that the properties of OS2 to the latter of OS2 for your clone. Unless the manufacture OEMs a version, you may be out of luck. Owners of "compatible" computers that better get ready to hear the phrase, "We currently have no intention of growings support for your intention of growings support for your

hardware combination."

But years from mow, when programmers sit around and wax nostalgic, somene is sure to ask, "Remember OS2?"
Everyone will chuckle. Despite the hype and fanfur. I betwee OS2 is going the obstart-lived because the operating system has become as nominer changed between the continuer changed to accust com-made chiga! If you use IBM software. OS2 may not here up to the capabilities you OS2 may not here up to the capabilities you IBM. And now you see, in my opinion, the read reason for OS2.

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The PC Tutor solves practical problems and explains points of general interest about using your hardware and software more productively, and answers basic questions about DOS and systems in general. To see your questions answered here, drop a line to PC Tutor, PC Magazine, One Park Avenue, New York, NY 10016.

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ARCNET LIMITATIONS

In an article dealing with Standard Microsystems Corp.'s ARCnet interface cards ("Making Connections: LANs Under NetWare," PC Magazine, December 9, 1986), you said ARCnet can be set up in a physical station-to-station topology. Sure enough, I connected a terminal to my server using two T-connectors, one cable, and two terminators, and it works just fine. Is this a low-cost way of bypassing the fournode limit on a passive hub?

Phil Huhn Ypsilanti, Michigan

Mr. Huhn, regular ARCnet cards are not designed for connection in a station-to-station topology. The review referred to special "high-impedance" cards that Standard Microsystems offers for this kind of hubless connection. The traditional ARC net cards are low-impedance devices, and a station-to-station connection won't go very far before signals become distorted and frequent transmission retries slow down the system

Standard Microsystems has a better alternative with its twisted-pair ARCnet cards. These cards use twisted-pair wire in a station-to-station wiring topology. Each card costs \$295, and you can run 400 feet of wire before needing a \$375 repeater. A link device (\$375) interconnects twistedpoir ARCnet with the traditional coaxial cable/hub system

APPLICATION RECOMMENDATIONS Can you recommend any good networked application software for a retail store? We

need a point-of-sale system for our lumber-and-hardware retail business. We have

three PCs we want to use. J. L. Destauriers Caraquet, New Brunswick

Canada Your letter is typical of many we receive asking for help finding a specific kind of networked application. Some help has ar-

rived on the scene. Both Novell and 3Com Corp. sponsor directories of software developed by other componies that run on their networks The 3Com Compatible Products Direc-

tory tells you what products 3Com certifies and describes major tools like database and accounting programs. The directory sacrifices volume for certified compatibility. It is available from 3Com dealers.

The Novell directory contains hundreds of specific applications ranging from auto parts store software to Chamber of Com-

 The traditional ARCnet cards are low-impedance devices, and a station-tostation connection won't

become distorted.

go very far before signals

merce and subscription management systems. The authors only reprint the vendors' claims and don't certify anything. However, the index heading Inventory Control includes 76 entries, many with point-of-sale interfaces. You ought to find something there you can use. Anyone interested in networked applications can order the NetWare-Compatible Software Directory from his local bookstore. The ISBN is 0-912603-70-4

NETWARE TOKEN, RING PROBLEM

I ran into a problem during an installation of IBM Token-Ring Network hardware running Advanced NetWare, Version 2.0. I believe Novell does not report "out-ofenvironment" errors during the system log-in script.

The floppy disk on a PC workstation contained a CONFIG.SYS file with device commands for the three files necessary for Token-Ring hardware. The AUTOEXEC BAT file contained only three lines: ANET3, to load Novell's Redirector Shell: F:, to change to a virtual network drive; and LOGIN, a NetWare command.

Within the system log-in script, I tried to: (1) Map my normal drives; (2) Map my search drives (six total); (3) Set prompt=\$P\$G; (4) Set Comspec=s-2: command.com.

After booting up. I constantly received invalid COMMAND.COM errors when programs were terminating, and also the system was constantly reloading COM-MAND.COM from A:, not from my S2 drive as requested.

If I typed SET at a DOS prompt, the first

■ CONNECTIVITY CLINIC

few anvironment variables were garbaged, but my prompt and path were fine; only to the MPEV. It is come that the most and not a solid part of the most and the mo

Greg Stocking (No address supplied)

First, Mr. Stocking, please send me your address. You correctly diagnosed and treated the symptom, but there are some other things you should consider. First, I assume that the applications you ran were called after you exited the log-in script. If you try executing a program from within the log-in script, the environment won't be

Anyone attempting to run DOS 3.3 workstations on a Novell network should get a new DOS 3.3 object file.

established and you'll get the symptoms you described.

Are you using DOS 3.3? Anyone attempting to run DOS 3.3 workstations on a Novell network should get a new DOS 3.3 object file from a Novell dealer. This new progrum code takes care of some environment problems experienced with DOS 3.3. This file is added to the GENSH2 diskette and linked into the NetWare shell program when it is generated.

Speaking of IBM's drivers for Token-Ring, everyone should note that IBM has replaced the NETBIOS program with a module sporting the catchy name dxm0mod.sys.

LANTUNING TIPS

One of the most useful tricks I've learned as a LAN administrator involves using RAMdisks. I create very small RAMdisks is to allocate drive letters so that, regardless of how many local drives; a workstand on has, the same letters are usingstat to network drives on all stations. This makes to possible for the same batch files on the network hard disk to work for all workstands to the same batch files on the network hard disk to work for all workstands. For example, on machines with one RAMdisks and one 64fk RAMdisk. This callocates drives C; D; and B; to the

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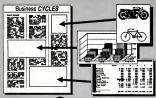
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 A RAMdisk lessens network traffic and

contention for the network hard disk.

I use the 64K RAMdisk to increase performance. At boot time, COMMAND .COM and other heavily used programs, like our menu program, are copied to the RAMdisk. This lessens network traffic and contention for the network hard disk, since they are available on the workstation's RAMdisk. I use these tricks on 3Com's Ether series and 3 Plus networking software, but I think they would apply to others as well.

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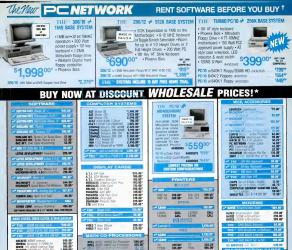
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The 80286 Test Results PC Magazine Did Not Show Its Readers...

Northgate Computer's Throughput Was Fastest of All Systems Tested!

PC Magazine's Feb. 16, 1988 issue reviewed Northgate's 80286 System and 20 others.

PC Labs performed throughput tests on all systems as well as the standard disk performance tests.

Throughput tests performed by PC Labs confirmed Northgate equals or outperforms systems using drives with as fast as 28MS head access times

Unfortunately for Northgate, the editors did not report on throughput performance, but

only on hard drive access.
(IN CASE A DEFINITION OF
THROUGHPUT IS NEEDED—
IT IS THE SPEED AT WHICH
DATA GETS BACK AND
FORTH BETWEEN DRIVES

AND THE PROCESSOR)
Truth is, throughput is the real world of computing.
Head access speed is relatively meaningless.

In their comments on the Northgate System, they also stated that Northgate's RLL encoding of the drives and the 1:1 interleaving had no effect on hard drive accesses

hard drive access.

Northgate has never made a
claim about improving head access with these methods. INSTEAD, BY USING ADVANCED
HARD DRIVE TECHNOLOGY,
NORTHIG ATE DELIVERS
THROUGHPUT PERFORMANCETOEQUAL OR SURPASS
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USING FASTER, MORE EXPENSIVE HARD DRIVES.

The bottom line for the consumer is Northgate gives You More Computer For Your Money!

Northgate pioneered the technology that enables us to design systems using low-cost (but highly reliable) hard drives and enhancing their performance to yield real-time computer performance as good or better than systems using far costlier drives.

Frankly it hurt us to see the conclusions reached by PC Magazine based on PC Labs' testing. But...Northgate has been fully vindicated by the magazine's recognition of our top-rated throughput performance. More importantly, the buying

More importantly, the buying public now has meaningful results on which to base a purchasing decision.

A careful study of features, price and performance of all systems reviewed in that issue will prove to you that Northgate is the overall Best Buy!

Northgate was the first to offer RLL, 1:1 interleaving and

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If you want to really have your eyes opened, call our competitors, large and small and ask if you can get a hard drive with these features. You'll be shocked. Try it.

NOW FOR SOME REALLY GOOD NEWS...

Northgate's Enhanced Technology leaps ahead and totally

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On all Northgate 80286 and 80386 Systems currently shipping, we include a Disk Caching program at no extra cost. Using this highly efficient Disk Caching, once a file is read into memory, sawing or reaccessing it requires zero disk access. Much like a RAM disk, data is sawed when extiting the applications program.

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Tweive Metre Challenge: All the Action with None of the Sea Spray

BY STEPHANIE K. LOSEE
Were you one of the couch sailors who devotedly followed the
America's Cup races on television last year? Or perhaps you
wait restlessly for the spring
thaw so that you can take your
Pierson 35 out from under
wraps? In either case, Greylock
Software's Furber Metre Chal-

lenge can help bring the excite-

ment and atmosphere of sailing

closer to home.

Like flight simulators (see
After Hours, December 22,
1987) Twelve Metre Challenge
is a real-time simulation of navigation from the point of view of
the navigator. You are the captain of a 12-metre yach entered
in the America's Cup race. And
you have more decisions to

make than simply when to tack. Challenge is divided into five stages. In Pre-Challenge you determine the prowess of your opponent: Beginner, Intermediate, or Advanced. You continue by choosing the course, the number of heats.

and other aspects of the actual race. Then you move on to Crew Selection, an option you exercise again and again until the start of the race. (You can't swap crew members in the middle of the high seas!)

Crew Selection provides a lone list of potential crew members covering every job from physical trainer to tactician to fund-raiser. When you enter a name, the applicant's résumé and picture appear on screen. I found Crew Selection the most amusing job in Challenge: the applicants' mug shots make them look as if they're all being booked for prison (the salty personal comments reinforce this impression). Before hiring someone, you can elect to investigate your candidate's background by hiring detectives who are especially proficient at tuming up the type of information that usually appears in the Na-

The novelty of Crew Selection wears off quickly, as does that of the remaining Pre-Race options, involving boat design and training. You may want to avoid the details of preparing your boat by loading a preconfigured game.

tional Enquirer.

It's in Race mode that Twelve Metre Challenge shines. As a recreational sailor, I found the game's atmosphere very realistic. The race console provides you with information The scenery isn't exciting, but the game makes it easy to keep your bearing, by letting you rosate your view so you can keep an eye on

landmarks.



about your sails, rudder, opponent, heading, speed, wind, and elapsed time. You can change your screen's viewing angle to check out where your opponent and the next buoy are located. As the race progresses, you make choices that can save or lose valuable minutes by issuing orders to your crew. Captains who are prone to making "fatal" mistakes can order the crew to Abandon Ship (a command I admit I used twice when I was learning the game). But after minimal practice I was utterly absorbed in racing, and hours ticked by unnoticed

Racing with Challenge is nothing if not addictive, and the game gives even the most proficient player room to improve and to add more complexity and excitement to each successive race.

On the down side, Challenge's user interface is less than intuitive, and I found myself referring to the manual constantly. The manual itself proved a source of frustration, for although its explanations of basic racing terms and tactics were competent, it was inadequate as an aid for playing the game. For instance, nowhere in the manual is there an explanation of your boat's position in relation to the starting line before the beginning of the race. Challenge's CGA graphics

are dull, to say the least. A hunk

of brown in the distance is an island; your opponent's supposedly majestic vacht tacking in front of you is a pink-hulled cartoon that looks better suited to a bathtub than a video game. The folks at Greylock Software say that an upgrade slated for June will sport an improved user interface and EGA graphics. Although the present manual includes instructions for playing a human opponent via modem, that capability is not yet available. The new version will also adjust your boat design options to reflect the changes in the rules resulting from the New Zealand challenge.

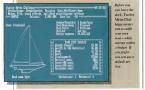
Zealand challenge.
Considering what Challenge
sets out to achieve, what it actually accomplishes is impressive. After some study of the
sailing terms in the manual—and several hours of
place—complete novices would
be well on their way to becom-

ing competent sailors.

Think of Twelve Metre
Challenge as a flight simulator
for navigators who'd rather sail
than fly.
List Price: Twelve Metre

Challenge, \$49.95. Requires: \$12K RAM, CGA, two disk drives or hard disk, DOS 2.1 or later. Not copy protected. Greylock Software Inc., P.O. Box 730, Great Barrington, MA 01230; (413) 528-5555.

CIRCLE 601 ON READER SERVICE CARD



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Check Mate

mode: ViewPoint is working to fix this problem. Check Mate lacks a net worth display, like the one in Managing Your Monev, which sums assets and liabilities and presents a bottom line, so you won't use this program if you like to analyze your financial situation. But if you're just trying to stay on top of your cash flow, it can belo.

List Price: Check Mate. Version 3.11, \$89.95. Requires: 256K RAM, two disk drives or hard disk, DOS 2.0 or later. Not copy protected. ViewPoint Software

Inc., 12101 Beechnut, Houston, TX 77072; (713) 495-6516, (800) 654,5901

CIRCLE 693 ON READER SERVICE CARD



Maxx Yoke Evens the Odds with a Touch of Double-Fisted Realism

BY MITT JONES

The 767's intercom squawked to life, warning me and a host of other weary passengers of our initial approach to Newark International Airport. The announcement threw me off guard, and the gentleman next to me once again managed to maneuver his substantial forearm onto the choice portion of

I drifted back to a recent encounter with Chuck Yeager's Advanced Flight Trainer. General Yeager's digitized image had smugly and repeatedly informed me of my ineptness as a pilot, merely because I found it easier to fly through objects than around them. "Sure, Chuck. Go ahead

and laugh," I mumbled as I slid my forearm onto the rear of the armrest. "Let's see how well you generate a few hundred lines of assembler code."

"What's that?" The guy I with the chunky forearms didn't understand.

Excuse me," I replied. nudging his elbow an inch forward. This guy obviously had never gone head-to-head with the General.

The last time I fought for my wings, I believed I was doing rather well, especially when I almost managed to land the F-18 without missing the runway.

The 767 gently banked, and I thought I spotted the crisscross of runways through the window. Harry Arms feigned a

cough and nudged my elbow off the armrest. This guy was good. Let's just hope the pilot's not using a joystick to land this fat crate," I offered, If I could

just distract him long enough "What's that?" "Would you please reach over and hand me that maga-

zine? "Certainly," he mumbled. reaching down and leaving the armrest open. Got it! Perfect

landing. The 767 touched down safe. ly, I managed to retain control of the armrest through the landing, and my skinned elbows would soon heal. But there on the ground, as I ducked away from an onslaught of overhead baggage on its way down. I realized one advantage that both the airline pilot and Chuck had over me-neither was forced to use a 2-inch joystick to control several tons of speeding metal.

Only days later, my problem was solved. I found the Maxx Yoke-a life-size simulation of aircraft controls that you can grab with two hands. It plues into a game port and clamps to a desk. I pounced on it. In a matter of several minutes of flight time, I had finally managed to land on the runway. Chuck was silent at last.

Two Fire Buttons

Manufactured by Alturas Corp. but distributed by Electronic Arts, the Maxx Yoke moves just like the real thing. A stainless steel shaft slides 21/2 inches into the yoke's nylon housing and turns 60 degrees left and right from center. One fire button rests atop each of the voke handles. A sliding lever on the front of the yoke housing serves as a throttle control if you're using Chuck Yeager's Advanced Flight Trainer or Microsoft Flight Simulator

Of course you don't get any feedback from the aircraft, as you would if you were really flying, but the spring-loaded action provides enough resistance to give the yoke a fairly realistic

feel More importantly, the yoke allows control of the simulated aircraft proportional to the amount you move the voke. If you rotate the voke a few degrees to the right, for instance,

the aircraft banks right a few degrees. You also get independent control over the pitch and bank attitude of the aircraft, a plus over joysticks that not only adds

realism but makes the simulated aircraft easier to fly. Though clearly designed for flight simulators, the Maxx Yoke also works with other software. Once you've plugged the 15-pin connector into your game card, any software that

recognizes a joystick will recognize the Maxx Yoke. A collar lock that eliminates the push/ pull movement makes the voke an excellent choice for auto racing software, for instance.

Three-Dimensional Control

But keep your old joystick around if you enjoy a round of PacMan or the like every now and then. Whereas the Maxx Yoke gives you more-intuitive control over objects moving in three-dimensional space, joysticks provide more-intuitive control over objects restricted to motion in two dimensions

The Maxx Yoke feels remarkably solid for its \$129.95 price. My only reservation concems the durability of its builtin springs, though our evaluation unit showed no signs of losing its pep after many hours

of play. Is this man-sized toy worth its price? You bet-if you enjoy flight simulators, that is. Chuck Yeaver's Advanced Flight Trainer and Microsoft Flight Simulator take better advantage of the Maxx Yoke's features than other packages do, at least for the time being. But the Maxx Yoke will add a little lift to any flight simulator.

Of course, today's jet fighters typically use a control stick rather than a yoke, but don't fret: I won't tell Chuck we're using a voke if you won't List Price: Maxx Yoke, \$129.95. Requires: Game port. Electronic

Arts. 1820 Gateway Dr., San Mateo, CA 94404; (415) 571-7171

CIRCLE 692 ON READER SERVICE CARD



The Maxx Yoke plugs into a standard 15-pin game port, replacing your joystick with a life-size simulation of aircraft controls.

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Managing Money

you are like me, you have done these calculations numerous times before, but you have left off items on both sides of the formula. Managing Your Mon-ey doesn't forget about those gold coins in the safe-deposit box, for example, or the current balance on your MasterCard.

While the standard warranty includes free customer support (without an 800 number), an optional 349.95-a-year plan offers one annual program update and a quarterly newsletter from Andrew Tobias. Considering Tobias's stature as a financial advisor, the tips in the newsletter alone make the rather hefty update charge worthwhile.

The major change in Version 4.0 of Managing Your Money is the evolution of the Notepad into a full-fledged word processor. Instead of a simple notepad, you now get Write on the Money, a word processor with all of the features of a low-end standalone package. It can be configured to emulate a number of popular word processors, including DisplayWrite 3. Microsoft Word, WordPerfect, and WordStar. While Write on the Money is definitely low-end, resulting in less than complete emulations, it is more than adequate for knocking off letters and notes. It can also be used to hide entire documents behind comment lines anywhere in the program (such as the comment line of checks).

In solution to the features mentioned above, there are section that the se

Managing Your Money is the most powerful and easy-to-use personal-finance package available. And it is almost fun to use. thanks to Andrew Tobias's sense of humor With comments and help screens written by Tobias around every corner. there is enough financial advice in this program to make up another book. With the latest release, Tobias and MECA have taken one of the best and most useful programs around and made it a little bit better. Go get it and you will improve your grip on your personal finances.

List Price: Andrew Tobios'
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355 Riverside Ave., Westport, CT
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CIRCLE 664 ON READER SERVICE CARD



Check Mate's data entry screen always displays your last ten transactions

PERSONAL FINANCE

Check Mate Keeps Watch on Your Cash Flow

BY DONALD TRIVETTE

If you have any money left after tax season, you can use View-

tax season, you can use Viewpoint Software's Check Mate to distribute it to your creditors, and with the same program you can establish a budget that will track your income and expenses in 1988.

Check Mate is a menu-driven checkbook for the home user and small-business person. Its familiar check-register accounting system supports multiple bank accounts, fiscal years beginning in any month, and transactions limited only by disk space. There are enough canned reports-including "Income vs. Expense" and "Asset vs. Liability"-to keep an accountant blissfully occupied. If that's not enough, Check Mate can create reports to your own specifications, and an export feature lets it transmit data to a Lotus 1-2-3 spreadsheet. This software combines

This software combines some of the best features of similar programs while avoiding many of their faults. Check Mate is as fast and easy to learn as Quicken; it allows posting to multiple badge categories like Managing Your Money, and it avoids the cluttered screens of Checks & Balances. The organization and cluttered screens of Check & Balances. The organization and cluttered screens of For example, the enter-check command displays the last ten transactions, which is important for folks like me who forget what they've down.

Another powerful feature—again, appreciated by klutzy nonaccountants like myself—is the ability to edit and correct all entries at any time, with the automatic updating of corresponding records.

corresponding records. It's apparent that considerable thought went into the program design. To reconcile checks, for example, you can tick them off by individual check numbers, or you can mark blocks of checks by using a range of check numbers. Closing one fiscal year and beginning another is clearly explained in a section of the manual. A three-level password system keeps the noay at bay.

Check Mate includes the usual features like remembering monthly transactions, batch-printing checks, and supporting a wide variety of check forms and window envelopes. Unfortunately, the program dessaft remember recurring addresses when it prints checks in batch



rever Managing Your Money feature. does more than you'd expect. Note Andrew Tobiate's nearning here that the return expected on an investment may be too opments.



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PERSONAL FINANCE

Managing Your Money at 4: Slow but Steady Growth Continues Unabated

BY PHILIP F. H. ROSE

If you are like most people, your home computer is used mainly for work-and games. And yet personal financial management programs are one of the first things that come to mind when you think of home computers. The biggest obstacles keeping most people from using them have been the programs' difficulty of use and the users' lack of understanding of what these programs can do for them. Andrew Tobias, author of

the perennial best-selling book The Only Investment Guide You'll Ever Need, distilled his financial acumen into a personal financial program-Andrew Tobias' Managing Your Money-4 years ago. The incredibly helpful program, from MECA Ventures, is not only liberally peppered with Tobias's wit but is also comprehensive in its approach and easy to use. Version 4.0, like the revisions that came before it, has added current tax information and enhancements

AFTER HOURS INDEX

Help with your checkbook

Grab hold of Flight Simula-

Twelve Metre Challenge

On the rough road to the

Check Mate

Maxx Yoke

and a little more

tor with both fists

America's Cup

to existing program features. Monaging Your Money doesn't overwhelm you. While it offers more functions than its competitors, you're free to use only the ones that you want. Later you can add levels of detail as you get everything under If you barely have a handle

on your checkbook balance and your long-term budgeting consists of merely wondering where it all goes, then Managing Your Money can beln. Or if you already have your cash flow under tight control but are trying to leverage your investments, again Managing Your Money

can help The core of the program addresses checking account management. You can enter the information after writing checks. let Managing Your Money print them, or tie into Chase Manhattan Bank via modem and have the bank print and mail your checks. But it's when you go beyond checkbook balancing that you see the value of Monoging Your Money.

Your Net Worth

As you record incoming and outgoing dollars, the money is allocated to budget and tax categories. Later you can print out budget summaries and sample tax forms

In the Portfolio Manager, you can keep track of virtually any kind of investment, from regular stocks to tax-free municipal bonds and commodity futures. The manual and on-line help screens do an excellent job



tills is at the heart of Andrew Tobias' Managing Your Money. The program will print the check, debit your checking account, and adjust your net worth

of explaining how different ute charge for some other parts types of investments should be entered and maintained. As you buy and sell investments, your net worth and tax records are maintained automatically. Manoging the Market, a \$79.95 add-on product offered by MECA, links with the Dow Jones News Retrieval service for automatic computer updat-

ing. A membership and some

free on-line time are included.

but there is a small charge for

each stock quote and a per-min-

of the service. If you were to get nothing

else from Managing Your Money, the Net Worth section would pay its way. Pulling information from your bank accounts, your investments, your loans and the equity you've built up against them, your insurance and pension plans, and other sources. Monagine Your Money automatically maintains a clear breakdown of your net worth. If

Is It a Calculator or a Come-on?

Who needs another calculator? Andrew Tobios' Financial Calculotor is not solar powered, nor will it pop up over another program. But its purchase price can be applied to the cost of Andrew Tobias' Managing Your Money, and that in itself is its raison

Munaging Your Money has sold like hotcakes since it first came out, but apparently there are a few hapless souls who've never seen it in action. So its publisher, MECA Ventures, has sliced out the program's calculator module and packaged it for \$44.95, less than one-fourth the cost of the full program

But this is no SideKick clone; functions include rental property analysis, retirement planning strategy, and mortgage refinancing calculations. When it says it's going to calculate the value of an IRA, it means with oll factors taken into account, including your age, expected tax savings, and alternative invest-

MECA hopes this Financial Calculator will entice you into buying the complete package, but you may find it's all the financial help you need .- Gus Venditto

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